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ON A COLLECTION OF MICE (*MUS HIRTENSIS* AND *M. MURALIS*) FROM ST. KILDA.

By G. E. H. BARRETT-HAMILTON, B.A., F.Z.S.

MY friend Mr. Eagle Clarke has placed in my hands a set of 24 mice obtained at St. Kilda by Mr. James Waterston in June 1905, with a request that I should examine and report upon them to the Scottish "Annals." I do so with great pleasure because in the first place it is always satisfactory to see any critical or rare forms in series, and it is in the second place doubly satisfactory to find that the examination of such a series reveals nothing that is not confirmatory of previous work.

The history of the St. Kilda mice is now well known. Visitors to that island had long been aware of the existence of some sort of mice there (see for instance Seton's "St. Kilda, Past and Present," 1878, p. 132), but Mr. J. Steele Elliott appears to have been the first naturalist to collect and preserve specimens of them (see "Journ. Birm. N. H. Soc." Apr. 1895, and "Zool." 1895, pp. 281 and 426) and to note that they appeared different from ordinary mice. Finding Mr. Steele Elliott's specimens in the British Museum, I was led to study them, my friend the late Henry Evans was the means of procuring a few additional specimens, and the

result was a paper in the "P. Z. S." (Feb. 7, 1899, pp. 77-88, Pl. ix.) in which I described and figured as new species *Mus hirtensis* allied to *Mus sylvaticus*, and *Mus muralis* allied to *Mus musculus*. The paper was reprinted in this Journal (July 1899, pp. 129-140) and will be found to contain a full discussion of the two species as they were there designated. The present specimens are useful for the purpose of verifying their already described characters.

Taking first *Mus muralis*, of which there are 13 specimens in all, the colour is remarkably constant and does not show striking variations such as might be expected to occur in a subspecies in process of formation, an important point when it is remembered that, as regards its colour, this Mouse is a very distinct form.

The dimensions indicate a Mouse which, although of somewhat robust proportions when compared with *Mus musculus*, is far behind, especially in length of foot, *Mus musculus faroensis* of the Faroes. The feet and ears are, however, larger than in *Mus musculus* of houses, as the table below will show.

The following are the dimensions of the series :—

			H. and B.	Tail.	Hd. ft.	Ear.
Male,	No. 3	. . .	82	81	17.5	13.5
"	4	. . .	80	77.5	17.5	13.5
"	18	. . .	87	81	17	12.5
(Juv.)	21	. . .	73.5	76	17	12.5
Female,	No. —	. . .	83	82	17	13.5
"	2	. . .	93	89	18	14.5
"	5	. . .	82	81	17.5	13.5
"	12	. . .	96	92	18	13
"	20	. . .	81	77	17	12.5
"	22	. . .	77.5	72	17	12
(Juv.)	19	. . .	73	74	16.5	12.5
"	13	. . .	76.5	78	17	12
"	24	. . .	79	75	17	12
Average of 9 adults, 3 males and 6 females			84.6	81.4	17.4	13.16
Average of 6 females from spirit on which original description was based			85.1	81.5	16.5	12.9
Average of ♂ and ♀ of <i>M. m. faroensis</i> (W. Eagle Clarke)			99	95.7	20.6	13.75
Average of 3 ♂s, 2 ♀s of <i>Mus musculus</i> proper measured by N. B. Kinnear			83.4	83.6	16.6	12.2

The dimensions of the specimens measured from spirit differ slightly from those of the present series, a discrepancy which may be due to methods of preparation. It is remarkable that all the sets of wild mice should differ from the true House Mice in showing a slightly shorter tail.

Mus muralis and *M. m. faroensis* are clearly robust developments from the *Mus musculus* stock, the robust form being accompanied by a very distinct colour pattern tending in the same direction in both cases, but very much more marked in *M. muralis*.

Mus hirtensis.—As regards coloration this form is evidently not so "fixed" to type as *Mus muralis*, since the underside varies in colour from specimens with the whole surface buff to those which exhibit only a strong staining of this colour, most deeply on the central line, the latter arrangement being that which obtains in *M. hebridensis*. But all are quite distinct from ordinary British *sylvaticus*.

The following table exhibits the dimensional distinctions of the various British forms of Field Mice :—

	H. and B.	Tail.	Hd. ft.	Ear.
Average of 10 <i>hirtensis</i> , 5 ♂s and 5 ♀s .	104	100	24.7	16.25
Average of 4 <i>hebridensis</i> .	108	97.5	24.25	15.75
Average of 62 ♂♂, <i>intermedius</i> .	92.6	88.2	22.6	15.4
Average of 4 <i>wintoni</i> .	110.75	111.75	23.75	18
1 from Shetland .	102	100	22	15.5
Average of 6 <i>celticus</i> .	85.3	80.8	22.3	14.6

Apart from its colour *M. hirtensis* is thus shown to be a robust form, excelled in general size only by *wintoni*, and agreeing with *hebridensis* except in regard to its larger ear. These two mice are thus closely allied: their large feet exceed even those of the giant *wintoni*, while their ears, on the other hand, especially in *hebridensis*, approach the lesser dimensions of *intermedius*. Beside them *celticus* appears as quite diminutive.

In view of the approaching publication of my book on British Mammals, I propose to leave unattempted here any discussion of the relationship of these forms or of their title to be accorded full specific rank. It seems hardly doubtful, however, that were they animals of such a size as

to make their peculiarities of dimension patent to the naked eye and not mere matters of measurement—say, were they the size of Leopards—their distinctive coloration and remarkable difference in size and proportion of the limbs and ears might have a very different influence on the ordinary mind.

KILMANOCK, ARTHURSTOWN, IRELAND.

THE BIRDS OF FAIR ISLE, NATIVE AND MIGRATORY.

By WM. EAGLE CLARKE, F.R.S.E., F.L.S.

PLATES I. AND II.

THOUGH lying midway between the Orkney and Shetland archipelagoes, Fair Isle has remained among the least visited of all the inhabited isles of the British seas. That this should be so is, no doubt, in a measure, to be accounted for by there being no regular communication by steamer with the island : a fact which is probably due to the entire absence of a reasonably good natural harbour, and to the dangerous nature of the fierce tidal streams which rush along its coasts.

Fair Isle, like Faroe, probably signifies Sheep Isle ; and it is perhaps best, if at all, known to the general reader from the fact that it was the scene, in the autumn of the year 1588, of the wreck of "El Gran Grifon," one of the ships of the Spanish Armada, flying the flag of Juan Gomez de Medina. The island is situated some twenty-four miles S.S.W. from Sumburgh Head, Shetland, and twenty-six E.N.E. of the Orcadian island of North Ronaldshay. It is, roughly speaking, oblong in form, having its longest axis from N. to S. of about two and three-quarter miles, and averages about one mile in width. Though a circuit of the island may be made in about nine miles, yet so indented is its coast-line by geos that its in-and-out circumference is not much short of twenty miles.

Except a small portion of its southern coast, the island is everywhere surrounded by high inaccessible cliffs, ranging from 100 to close upon 600 feet. The cliff scenery is bold and rugged in the extreme, especially on the north and west coasts ; and its interest added to by numerous off-lying



FAIR ISLE FROM THE SOUTH-WEST.

pinnacles, stacks, and skerries, which, like the neighbouring cliffs, are the home in the summer of innumerable rock-loving sea-fowl. Caves and natural arches are also numerous, for the geological structure of the island readily lends itself to their formation. The cliffs on the east side are not so high, but there we have the picturesque "Sheep Craig"—a noble mass of practically isolated rock rising almost perpendicularly from the sea to a height of about 500 feet (the natives say 590 feet), and the greatest resort of sea-fowl in the island, and formerly a nesting station of the Sea Eagle.

There are two natural harbours. Of these, the one on the south is to all intents and purposes the only one used. It is, however, beset by a labyrinth of rocks, and across its mouth rushes a furious tidal roost, so that the aid of native experience must be sought by those who would enter it even in a boat. There is a smaller and better harbour on the north section of the east coast, but it is some distance from the inhabited portion of the island, and is not used by the Islanders.

The cultivated land occupies the central part of the southern third of the island, and is flanked by grass land more or less rough in character. The area under cultivation is from 200 to 300 acres in extent, and the soil, which is peaty, produces oats, bear, turnips, potatoes, and cabbages.

The northern two-thirds is mostly barren, being carpeted with stunted heather and grass, among which creeps a species of juniper. The ground here is high, especially all along the west, where it culminates in Ward Hill (712 feet), the highest point in the island. This portion of the island is also flanked in places with grass land; and lying at its southern limit, on the west, there is an extensive wet moor known as "Sukka Moor," with many lochans and a connecting burn. This area would seem to be well suited for breeding of such species as the Golden Plover, Curlew, Snipe, and Dunlin; but is, perhaps, either too exposed or storm-swept: at any rate none of these birds appear to resort to the island for nesting purposes.

A number of burns traverse the island to enter the sea as waterfalls on the face of the cliffs. And there are two small natural sheets of water at the North end of the island.

There are no trees or shrubs of any description, native or cultivated, and thistles and bracken (confined to a small belt in the N.E.) are the giants of the native flora.

The natives number a little over one hundred, but a few years ago were much more numerous. They are crofter-fishermen, and live in the most primitive fashion; indeed, after the manner of their forefathers. They were most kindly disposed towards us, and afforded us every facility in their power for carrying out our biological survey. That the island has been inhabited for a long period is manifest from the presence of tumuli, in which cinerary urns have been discovered.

Since 1892 there have been two lighthouses on the island, namely, Skadan at the extreme S.W., and Skroo at the N.E. limit. Both are furnished with powerful white revolving lights.

During the past autumn, I spent five weeks on Fair Isle with my friend Mr. Norman B. Kinnear, whose congenial companionship and indefatigable co-operation it is a pleasure to acknowledge. We arrived on September 2, and left on October 7. Previous to our visit, nothing whatever of a reliable nature was known regarding the fauna and flora of the island, and practically nothing about the geology. Did it belong zoologically to the Shetland or the Orkney group? This was a problem we desired to solve, as well as to obtain information on bird-migration, and, indeed, on matters generally relating to its natural history, past and present. We are now able to say that zoologically and geologically, as well as politically, that the island is an outlier of the Shetland group; for it lacks among terrestrial animals the Shrew, Vole, and Toad, all of which are members of the Orcadian fauna; while its rocks belong to the Shetland section of the Old Red series, as I am informed by my friends Drs. Peach and Horne, who have examined the specimens procured by us. As to the plant-life of the island, my colleague, Prof. Trail, will report on our collections in due course. I may say here that about a thousand insects were obtained, and will also be reported upon by the specialists, to whom the specimens have been submitted for examination.



FAIR ISLE. THE SHEEP CRAIG FROM THE SOUTH-WEST.
(A former breeding-place of the Sea Eagle.)



FAIR ISLE. THE SOUTH-WEST CORNER AND SKADAN LIGHTHOUSE.

A small series of mammals was also collected, and are reserved for a later communication to this magazine.

Birds formed the main subjects of our investigations; and as our visit was timed for the height of the autumnal migratory season, a considerable number of interesting species came under our notice as birds of passage. Indeed, we found Fair Isle to be a surprisingly good station for observations, perhaps second to none in Scotland. It would appear that many birds departing in autumn from their summer homes in N.W. Europe, and travelling *viâ* the British coasts to reach their winter quarters, arrive at this island on their way south, but do not always visit Shetland *en route*—that is to say, their lines of flight from the N.E. carry them south of the Shetlands to strike this island. That this is the case in some seasons is undoubted, and the observations of the past autumn bear this out, for while we saw great numbers of migrants, especially passerines, at Fair Isle, yet Mr. Thomas Henderson, located at Dunrossness, some thirty miles to the north of us, tells me that it was a poor season there. Our experience, too, at Fair Isle was in great contrast to that of Mr. Laidlaw and myself in southern Shetland during the latter half of September in 1900, when we saw comparatively few species of migratory birds, and of these only two, the White Wagtail and the Wheatear, were passerines. At Fair Isle Mr. Kinnear and I noted no less than fifty-seven species on passage, and of these no fewer than twenty-four were passerines.

This interesting subject as to where migratory birds arrive on, and depart from, our coasts when on their way from and to northern continental Europe, has been alluded to by me in a previous paper ("Annals," 1901, p. 5), and is well worthy of further investigation. Fair Isle, there can be no doubt, does receive many birds on passage after they have arrived at, and departed from, Shetland on their way south.

We were fortunate, too, with rare and uncommon species, which have always an interest peculiarly their own. As a rule, however, they contribute far less towards the solution of migration problems than the commoner forms and are often veritable stumbling-blocks in the path of research, since

in not a few instances their occurrence admits of no reasonable explanation, though this cannot be said to be the case with our Fair Isle captures. The rarities alluded to were the Arctic Redpoll (*Acanthis hornemanni*), a species not hitherto detected in Scotland, of which several specimens were obtained; the Yellow-browed Warbler (*Phylloscopus superciliosus*), the second Scottish example; the Bluethroat (*Cyanecula suecica*), not previously known to have occurred in either the Orkneys or Shetlands; the Lapland Bunting (*Calcarius lapponicus*), a rare visitor to Britain, but present in numbers at Fair Isle; and the Green Sandpiper (*Totanus ochropus*), another species not previously detected as visiting our Northern Islands. A rare visitant was seen, but not obtained, namely, a Little Bunting (*Emberiza pusilla*), of which only one occurrence has previously been recorded for Scotland.

At such a favourably situated and compact station it was possible to have one's finger, as it were, on the pulse of the feathered stream rushing southwards at the season of our visit; to note its fluctuations, either as quickening under influences highly favourable, or its slackening or arrest during stressful periods, or, again, its even flow under normal conditions. Here, too, we could note the sequence of arrivals and departures, and be able to ascertain what was new each day and what had passed on; also the duration of the movements of a number of species.

An opportunity was also afforded for the correlation of the migratory movements observed with the varying influences of the weather conditions. To this end the Weather Reports for Europe issued by the Meteorological Office have been consulted, and a comparison instituted between the two sets of phenomena.

Owing to the total absence of cover, except the brackens alluded to, the patches of potatoes and turnips formed our main hunting grounds for migrants among the passerines; but while these afforded most effective shelter for the travellers, they proved to be most difficult ground for the work of observers. The immigrants were loth to quit these hiding and resting places, and usually only did so on being close pressed, when they took a very short rapid flight and dived, as it were, into

the thick vegetation a few yards ahead, to run before us, concealed in the furrows, until again pressed, when they repeated their tactics. In this way the various species of Warblers cost us a lot of trouble ere their identity was established.

The ubiquitous Twite also added to our difficulties. After the corn was garnered, the numerous family parties of this species gathered together and formed vast flocks; and these were joined by the immigrant Finches of various kinds, rendering the latter very difficult to detect among hordes of the native bird.

In addition to the numerous birds of passage, a number of native—*i.e.* breeding—species came under notice; among these was the Fulmar Petrel, which has quite recently established itself as a summer visitor to the island. We also obtained some interesting information relating to some birds of the past, namely, the Sea Eagle, Great Skua, Rock Dove, and a Tern, all of which are now banished as native species.

Concerning the migratory and native (past and present) birds, full particulars will be afforded under their respective species in the systematic section, which forms the concluding portion of this contribution.

Before proceeding to the details relating to the bird-life of the island, I desire to discharge, without further delay, a pleasant duty. I have to express our sincere thanks to John Bruce, Esq., of Sumburgh, for the privileges which allowed us to wander at will over all parts of the island, and to collect such specimens as we desired; to the Commissioners of Northern Lighthouses for the permission they graciously granted which enabled us to reside in the Skadan Lighthouse; and to their Secretary, C. Dick Peddie, Esq., for his kind co-operation, and for the loan of the photographs from which two of the pictures have been reproduced. Nor must I forget the acknowledgments due to Mr. and Mrs. Wallace, of Skadan Lighthouse, who did so much to make us comfortable and to assist us in every way.

I. DIARY OF OBSERVATIONS.

The following notes in diary form relate to the arrival and departure of birds of passage during our sojourn. With the commencement of each week the weather prevailing over Europe is

given in a summarised form, and its influence on the movements of the migrants indicated.

Weather for the week ending Sept. 9th.—During the whole period the weather over Northern Europe was unsettled, being under the influence of depressions arriving from the Atlantic; and the general direction of the wind was from between south and west. Gales were experienced in the British Islands and Scandinavia, but were not of great force. The weather was not sufficiently adverse to totally arrest migration, but the week was naturally an uneventful one. There was, however, a decided immigration of Snipe on the 6th, but these birds may not have travelled far.

Sept. 2nd.—Arrived at Fair Isle at mid-day. During the afternoon and early evening we observed small parties of White Wagtails on the beach at the south harbour; and on the rocks at the base of the cliffs on the east side a few Common Sandpipers were seen singly. Several Golden Plover, three or four Ruffs, and some Curlew were observed on the grassy slopes bordering the cliffs. On the margin of a burn a Green Sandpiper was disturbed; and a few Dunlin came under notice on the rocks bordering the sea at the south end of the island. Wheatears and Meadow Pipits were abundant, many of them being no doubt recent immigrants. Puffins were not observed on the sea immediately off the island after this date, and the Guillemots and Razorbills had already departed.

Sept. 3rd.—The only additions to yesterday's list of birds observed were a Willow Warbler and a Chaffinch (♀) on the face of the cliffs, and a Mallard at sea. The Fulmar Petrel and the Lesser Black-backed Gull were not observed after this date.

Sept. 4th.—The additions to-day were several Whimbrel, Snipe, and Turnstone.

Sept. 5th.—A Whitethroat was observed among the corn, and a Garden Warbler on the face of a geo.

Sept. 6th.—To-day there was a great increase in the numbers of Snipe. They are everywhere, even among the stooks of grain. The first Teal was also observed.

Sept. 7th.—The only bird of note seen to-day was an interesting one, namely a Lapp Bunting, whose familiar note I was glad to hear again, one year and one day after my first introduction to this species on the Flannan Isles.

Sept. 8th.—A pair of Tree Sparrows and an adult male Goldcrest were the only birds worthy of note to-day.

Sept. 9th.—Several Wigeon have arrived, also four Sanderling. The latter were observed on the only strip of sandy beach afforded by the island.

Weather for the week ending Sept. 16th.—At the commencement of the week the north of Europe, including our Northern Isles, lay in the track of depressions travelling in an easterly direction. As

the week progressed the conditions became modified. The S.W., W., or N.W. winds that prevailed rarely rose beyond fresh breezes on our coasts, but were stronger in force over Scandinavia, rising occasionally to a strong gale. The general trend of temperature was downward. These changeable characteristics were at times not sufficiently unfavourable to arrest emigration from the north, and hence arrivals at Fair Isle.

Sept. 10th.—The first Snow Buntings made their appearance to-day.

Sept. 11th.—Following the fine weather of yesterday a few migrants have put in an appearance. A Merlin, Lapwing, and a Little Stint were noted; and there was an increase of Golden Plovers, Snow Buntings, Common Sandpipers, Wheatears, White Wagtails, Meadow Pipits, and Turnstones. Several Lapp Buntings were seen, and one obtained.

Sept. 12th.—The Ruffs, seen daily since our arrival, were observed for the last time to-day; also the last Sanderling. The birds arriving since yesterday were Thrush and Wigeon. The Snipe are now few.

Sept. 13th.—The White Wagtails, which had been abundant to this date, were now reduced to a few, and these afterwards thinned off leaving only one at the day of our departure Oct. 7th. Two Dunlin of a remarkably small race were secured.

Sept. 14th.—Many Golden Plover and Snow Bunting, and an increase in Skylarks, Wigeon, and Snipe. The new bird to appear was an immature male Blackbird.

Sept. 15th.—The last Whimbrel noted, and a marked decrease in the number of Wheatears and Meadow Pipits. A few Thrushes, a Chaffinch, and a Common Gull observed as immigrants.

Sept. 16th.—An increase of Skylarks. Several Teal and Thrushes.

Weather for the week ending Sept. 23rd.—Generally fair and dry over Northern Europe, unsettled in Southern Europe. The distribution of pressure mainly anticyclonic over our Isles and Northern Europe, cyclonic elsewhere. Temperature decreased generally and low for the season. Dominant winds north-easterly or easterly, their force light or moderate breezes. On the 22nd and 23rd the weather was bright and fine over Scandinavia and the North of Scotland. These favourable conditions for the departure for emigrants from Northern Europe (fine weather extending to the British coasts) were followed by the main migratory movements observed by us at Fair Isle.

Sept. 17th.—More birds since yesterday. The Snow Buntings were seen in flocks for the first time, and Mallard and Wigeon are more numerous. The first Mealy Redpoll, Kestrel, and Red-breasted Merganser were observed

Sept. 18th.—The most interesting birds to-day were three Arctic Redpolls (*Acanthis hornemanni*). The other species more numerous represented were Skylarks and Snipe. Another Red-breasted Merganser arrived, also a Blackbird and several Thrushes. A pair of Jackdaws were also seen.

Sept. 19th.—A number of Lapp Buntings have appeared, and the species was noted daily as fairly common down to our departure on Oct. 7th. The last of the Common Sandpipers on passage was chronicled, and the first Jack-Snipe. The Ringed Plover, a small party of which had been observed daily, emigrated about this date.

Sept. 20th.—The feature of the day was the abundance of the Jack-Snipe.

Sept. 21st.—The usual migrants observed.

Sept. 22nd.—The favourable meteorological conditions of yesterday—fine weather and moderate S.E. breeze, has had a marked effect, for to-day Goldcrests are swarming everywhere, among the turnips, potatoes, and even the faces of the great cliffs, where they seem to be sadly out of place from our point of view. A number of Mealy Redpoles have also arrived. Two common Gulls and one Black-headed Gull—uncommon birds during our stay—were seen on the land.

Sept. 23rd.—The effects of the continuance of the highly favourable conditions for over-sea migration which have prevailed for the last two days were evident to-day. Bramblings were abundant and a few Ring-Ouzels, Redbreasts, Blackcaps, Chaffinches, Dunlins, and Herons appeared. Most of the Goldcrests, perhaps all seen yesterday, have passed on, at any rate they are much fewer to-day, and those seen may be fresh arrivals.

Weather for the Week ending Sept. 30th.—The favourable weather conditions characteristic of the closing days of the past week prevailed until the 26th, and were succeeded by a period during which less unfavourable weather was experienced. The barometer was highest over Northern and South-Western Europe, with moderate depressions in the intervening regions. The general direction of the wind over the northern countries was consequently N.E. or E. fresh or strong. Temperature low for the time of the year. At the close of the week a deep depression that was moving over Scandinavia was accompanied by gales over the North Sea, and these entirely arrested the migratory movements of birds, which had been pronounced during the early days of the period.

Sept. 24th.—This was probably the best day for migrants, but it being Sunday and the natives rigid Sabbatarians, we did not venture near the crofts, our chief hunting grounds. The only newcomer seen was the Siskin, but Goldcrests had evidently again arrived, for they were abundant on the faces of the cliffs.

Sept. 25th.—This was our greatest day among the migrants.

The arrivals being the Bluethroat, Yellow-browed Warbler, Redwing, and Ring Dove new to our lists ; also Blackcaps, Willow and Garden Warblers, Redbreasts, Wheatears, Ring Ouzels, Blackbirds, Chaffinches, Siskins, Meally Redpolls, Bramblings, Lapp Buntings, Dunlin, Jack-Snipe, and Wigeon. The passerines were chiefly observed in the patches of turnips and potatoes, among which we had a hard day. There can be no doubt that we missed a number of species, owing to the difficulties attending identification in such cover.

Sept. 26th.—The rush is over. Most of the birds have passed on ; and a few Garden Warblers and a Lapwing are the only species that need to be mentioned.

Sept. 27th.—Golden Plovers, Jack-Snipe, Blackcaps, Redwings, Goldcrests, Redbreasts, Bramblings are among the birds observed to-day—the dregs of the recent rush. A Red-breasted Merganser and Ring Dove were also seen.

Sept. 28th.—Most of the species mentioned yesterday are still here.

Sept. 29th.—Another adult male Arctic Redpoll (*Acanthis hornemanni*) obtained to-day. An increase of Meally Redpolls, Redbreasts, Redwings, Goldcrests, and Golden Plover still arriving on their way southwards.

Sept. 30th.—The weather broke during last night. A northerly gale all day. Only a few birds in evidence, and these were crouching for shelter behind the stone walls, or lying low among the stubbles.

Weather for the Week ending Oct. 7th.—A week of unsettled weather over North-Western Europe. At first the winds were not stronger than fresh breezes, but this was followed by barometric disturbances which caused gales over our Islands and Western Europe. The temperature underwent a further decrease in all regions. The migratory movements which at first were slight were arrested by the unfavourable weather conditions of the latter part of the week.

Oct. 1st.—A pair of Slavonian Grebes, a Red-breasted Merganser and a Razorbill in the North Haven. The first and last named are new to our list.

Oct. 2nd.—Tree Sparrows and Mealy Redpolls are now fairly abundant and seem to have settled down to stay. A Little Bunting was seen at close quarters, but unfortunately escaped. A few more Thrushes, Redwings, Wheatears, and Jack-Snipe have arrived.

Oct. 3rd.—Redwings more numerous and seen in parties of over a score. The first Long-tailed Duck appeared. A few Snipe and Jack-Snipe and a Kestrel also seen. Wheatears and Meadow Pipits scarcer though still present.

Oct. 4th.—More birds to-day. The newcomers include a Rook, the first Purple Sandpipers. A few Willow Warblers, Redbreasts, and a Merlin seen.

Oct. 5th.—N. gale and few birds.

Oct. 6th.—N. strong breeze, dull and cold. An uneventful day.

Oct. 7th.—As this was our last day on the island, it will be well to enumerate the migratory birds observed as still present. There were many Bramblings, Snow Buntings, and Skylarks; several Lapp Buntings, Mealy Redpolls, Tree Sparrows, Redwings, Wheatears, and Purple Sandpipers; a few Meadow Pipits and Goldcrests; one Siskin, Rook, and White Wagtail; also Mallard, Wigeon, Oystercatcher, Redshank, Curlew, Snipe, and Heron. Some of the species named probably winter on the island.

The foregoing record relates to the movements of no less than fifty-seven species, and chronicles several days when the tide of the feathered stream rose high, and yet the lanterns of the lighthouses contributed nothing to our researches, the only birds appearing at their lights being a Skylark, a Starling, and a Snow Bunting! We had two advantageously placed bird traps (lighthouses) and six enthusiastic observers, but such was the result. The explanation is not, however, far to seek. Here it is. There was not during the whole of the thirty-six nights we spent on the island a single one on which the weather conditions were favourable for the successful working of our decoys, namely the presence of abundance of moisture in the atmosphere to render the beams of these two powerful lanterns attractive—for attractive, we were assured, they are when the meteorological conditions in the shape of rain, drizzle, or mist prevail, and migrants are on the move.

This was a very significant demonstration of the difficulties which have to be encountered by those in search of migration data; and the necessity, happily recognised long ago in both England and Scotland, for the co-operation of a band of trained ornithologists to supplement the observations of the lightkeepers.

II.—THE BIRDS OF FAIR ISLE.

As the result of our investigations and inquiries, the Birds of Fair Isle, as at present known, number 100 species. Of these 80 have a place in the avifauna through our own observations. The Native Birds, *i.e.* the Residents and Summer Visitors (which together form the breeding species), are 31 in number; and the Migratory visitants, or Birds of Passage, 65. In addition, a few species are probably winter visitors to the island, but regarding these we have little positive information. A few (4) again have ceased to be Natives, though some of them may occasionally, or, in the case of the Tern and the Great Skua, periodically, visit the island.

In the preparation of this section I acknowledge with pleasure the assistance I have received from Mr. Tulloch, formerly one of the

lighthouse staff on the island, and from Messrs. Stewart Wilson and George Stout, natives of Fair Isle, the latter of whom has a very fair knowledge of the birds of the island, and has furnished me with a number of interesting notes made since our departure.

RAVEN, *Corvus corax*.—About a decade ago no less than six pairs of Ravens nested annually on the island. These, owing to their numbers, proved so destructive to the lambs that measures had to be taken for their reduction, and now only two pairs are resident. These and their young were frequently observed, and were comparatively familiar and unsuspecting. Five was the largest number seen together; perhaps a family gathering.

HOODED CROW, *Corvus cornix*.—This species is resident and fairly numerous, five or six pairs nesting in the cliffs. The birds were quite familiar, and were occasionally to be seen perched on the cottages, just as one observes them in Norway. They fed upon dead fish, etc., cast up at the heads of the geos, and also upon garbage to be found near the houses. No Continental representatives of the species visited the island on passage during our stay.

ROOK, *Corvus frugilegus*.—One appeared on the 4th of October, and on the 6th two were seen. They fraternised with the Hooded Crows. The natives told us that they occasionally see this bird on passage in both spring and autumn. Mr. George Stout informs me that four appeared on the 31st of October.

JACKDAW, *Corvus monedula*.—A pair seen on the 8th of September were the only birds of this species that came under notice. The Jackdaw is, in like manner, only an occasional visitor to Shetland; and though in Orkney it is now abundant, yet it was formerly only seen at intervals.

STARLING, *Sturnus vulgaris*.—An extremely abundant resident, nesting in the cliffs and buildings, and frequenting the cultivated ground and heathery uplands in search of food. Towards evening we noticed that they betook themselves in small parties to certain natural tunnels in the cliffs, some 40 yards in length, which connect the remarkable chasms known as the Reeves with the western ocean. In the recesses of these subterranean retreats, amid surroundings dank and dismal in the extreme, and with the surf of an ever restless sea roaring below them, these birds passed the night: wilder and more weird roosting places it would be impossible to conceive. Others retired to holes in the rocks, especially those below Malcolm's Head at the south-west end of the island.

CHAFFINCH, *Fringilla coelebs*.—The Chaffinch was observed on passage in small numbers between the 3rd and 29th of

September, during which period arrivals were noted on six occasions. It is an interesting fact that all the birds, which were of both sexes, were seen singly, though several were observed on the same day. Probably more important movements would follow later in the autumn, but these do not appear to have come under the notice of George Stout.

BRAMELING, *Fringilla montifringilla*.—This species is probably a bird of passage only. It appeared in considerable numbers on 23rd September, an early date for its arrival in abundance on our shores. After this it was quite numerous among the Twites, and was seen daily down to the date of our departure, 7th October. From 30th October to 3rd November, this bird was seen by George Stout in large flocks, along with Fieldfares, Blackbirds, and Redwings.

GREENFINCH, *Ligurinus chloris*.—This bird is said to be a winter visitor to the island, and I was shown one in a cage which had been captured during the winter of 1904-5. About twenty were seen on 4th November by Mr. George Stout.

SISKIN, *Chrysomitris spinus*.—A few were seen on passage. The first was observed on 24th September. On the following day when immigrants of various species were abundant several were seen, and it is quite possible that this bird was present in fair numbers among the Twites, in whose company the few detected were discovered. Single birds were afterwards seen by us on 5th and 6th October, and four were seen by George Stout on 18th October.

BULLFINCH, *Pyrrhula europæa*.—Mr. Tulloch tells me that he has seen this species on the island.

HOUSE SPARROW, *Passer domesticus*.—An abundant resident which seldom strayed far from the inhabited portion of the island. Enquiries made for the purpose of eliciting information as to when the island was first colonised completely failed, and the conclusion we arrived at was that the bird had been there time out of mind.

TREE SPARROW, *Passer montanus*.—This bird is a visitor to the island, probably when on passage farther south, and also perhaps as a winter resident. The first birds, a pair, appeared on 8th September; but the species was not observed again until 2nd October, after which date it was fairly numerous. Though this bird consorted with Twites and other species on the stubbles, yet it was seldom seen far from the houses, for whose vicinity it seemed to have a decided predilection. George Stout tells me that he saw twenty-one in a flock on 18th October.

MEALY REDPOLL, *Acanthis sp.*.—The Mealy Redpolls are admittedly one of the most difficult groups of birds to determine, and the specimens obtained on Fair Isle must, so far as their specific identity is concerned, be reserved for future consideration, since they do not seem to belong to the typical species (*A. linaria*) found on the Continent and elsewhere.

The first of these Redpolls appeared on 17th September, after which date it was seen in small numbers until 2nd October, when a great increase was observed, and the birds remained abundant down to the date of our departure. As a rule they fraternised with the hordes of Twites, and sought food in the stubbles; but a number of independents frequented the enclosures adjoining the houses in search of the seeds of the weeds which abounded there.

ARCTIC REDPOLL, *Acanthis hornemanni*.—Of this rare and beautiful native of Greenland, Iceland, and Spitzbergen, we obtained five specimens—a larger number than have been previously known to occur in the British Isles. The material available for the study of this little known species has thus been considerably augmented, and it is hoped that the young stages of its plumage, hitherto undiscovered, will be found among our Fair Isle captures. This, however, is not the occasion on which to discuss this interesting question.

The first birds to come under our notice were a party of three, consisting of a beautiful adult male and two younger birds, which appeared on 18th September and frequented a small enclosure in front of one of the crofters' houses where they fed on the seeds of weeds and were exceedingly tame. Here they remained for three days, when our attention was drawn to the fact and the birds secured. On the 29th a second adult male was obtained while seeking food among low herbage by a roadside. On 10th October another young bird was added to our collection. The adults in life appeared to be almost entirely white, and were very pretty and conspicuous objects. Four of these interesting birds have been presented to the collection of birds in the Royal Scottish Museum, Edinburgh.

This species has not hitherto been detected in Scotland, and only three or four are known to have occurred in England, all on the N.E. coast.

TWITE, *Linota flavirostris*.—This bird was remarkably abundant during the whole of our visit, and we did not detect the least indication of any diminution in its numbers through emigration. The Twite population of the island is to be reckoned in thousands. At first they were everywhere, especially on the face of the cliffs, where, in family parties and small congeries, they were engaged feeding on the seed-bearing plants which

spring from the interstices of the rocks. After the corn had been cut and garnered, these parties collected together and formed immense flocks which chiefly frequented the stubbles and the plots of turnips and potatoes. The great abundance of this species added much to our difficulties in detecting and identifying immigrants, especially among the Finches, which on arrival speedily joined the ranks of the Twites and became practically effaced by their numbers.

CORN BUNTING, *Emberiza miliaria*.—This is a resident species confined to the crofts, where, however, it is far from common, perhaps on account of the limited area of the island which is suited to its requirements.

LITTLE BUNTING, *Emberiza pusilla*.—On 2nd October one was well seen at close quarters as it rested on a stone wall in company with Twites, and its identity satisfactorily established though the bird escaped capture.

This is only the second occasion on which this species has been detected in Scotland, a previous visitor having been captured by a cat on the Pentland Skerries, and its remains submitted to me for identification.

SNOW BUNTING, *Plectrophenax nivalis*.—The first of these birds arrived on 10th September, and after this date a few were seen daily until the 22nd, on which date they appeared in flocks. A number of this species pass the winter on the island, as well as appearing on passage in both spring and autumn. It was quite abundant during the latter portion of our sojourn; and a single bird was captured at the lantern of the Skroo Lighthouse on the night of 4th October. I know no other bird whose presence helps to enliven desolate surroundings to the same extent as this; its delightfully cheery note, its pretty dancing flight, and its beautiful plumage, add a charm to the bleakest of landscapes even in the worst of weather, and their presence was always a source of pleasure to us during our lonely wanderings in the remoter parts of the island.

LAPLAND BUNTING, *Calcarius lapponicus*.—The first Lapp-Bunting was heard on 7th of September, and its notes awakened pleasant recollections of my introduction to this bird just a year ago at the Flannan Islands. The species did not come under notice again until the 11th, when several were seen and one was obtained. From this date onwards old and young birds were observed or heard daily, and in some numbers, down to our departure. Until the corn was gathered, these buntings frequented rough grass in search of seeds, but when the stubbles were available they resorted to them and consorted with the Twites and Bramblings. This bird is an expert

percher, and when disturbed while feeding it almost invariably alighted on fences, posts, and walls; and even appeared to be quite at home and readily balanced itself on a single strand of wire.

It seems to me strange, after my experiences during the past two autumns, that this species should have been abundant on two remote Scottish Islands, and yet should have entirely escaped notice elsewhere in Northern Britain. I may say that this bird again appeared in some numbers at the Flannans during the autumn of 1905.

SKYLARK, *Alauda arvensis*.—This species is a resident, but whether the breeding birds remain during the winter or are represented at that season by others from farther north is uncertain. We found the native birds common, but confined to the cultivated area. On 16th September a very considerable increase was observed, and the birds were then found in all parts of the island. This immigration was followed by a departure movement on the 18th, but the species remained fairly abundant down to our departure on 7th of October.

I was informed that during snow many skylarks are captured for food by means of horsehair snares. I am inclined to think that these winter residents are birds of Continental origin, for if it were otherwise the small native stock would soon become extinct through capture during the winter, in the manner above alluded to.

WHITE WAGTAIL, *Motacilla alba*.—This was the only species of Wagtail observed. It was quite common as a bird of passage, and was present on our arrival on the island in some numbers and remained so until 15th September, when a marked decrease, due to an emigratory movement southward, was noted. After this date only a few laggards were seen, and these were further reduced to two by 3rd October, one of which was present down to the day of our departure, 7th October, a very late date for this species to have remained so far north. The birds haunted the few strips of beach afforded by the island, being attracted there by the flies which abounded among the decaying seaweed at or above high-water mark. Others were observed as frequent visitors to the refuse heap near the lighthouse buildings where flies were likewise abundant.

MEADOW PIPIT, *Anthus pratensis*.—This species is a common summer visitor to the island, and is also observed abundantly on passage in spring and autumn. It was present in numbers down to 15th September, when many departed on their journey southwards. After this it was observed in small numbers down to the end of our visit. The main arrival of birds of passage

took place on 11th September, on which date numbers appeared from the north along with Wheatears and some White Wagtails.

ROCK PIPIT, *Anthus obscurus*.—An abundant resident. Very common in all parts of the island, but especially so on the stubbles after harvest.

GREAT GREY SHRIKE, *Lanius excubitor*.—This species was once seen on the island by Mr. Tulloch.

GOLDCREST, *Regulus cristatus*.—This species occurs abundantly as a bird of passage. The first arrival of the season was an adult male, which entered one of the houses on September 8th. On the 22nd they were present in great numbers, being especially in evidence on the face of the cliffs all round the island, where they appeared to be strangely out of place amid the wild storm-swept rocks; and they were also abundant in the patches of turnips and potatoes. Nearly all these birds departed during the night which followed, for only a few were seen on the 23rd. Other arrivals were observed on the 24th, 27th, and 29th, but, as on the previous occasion, the majority of the birds, if not all, remained for one day only. A few were also noted on 1st and 6th October.

GARDEN WARBLER, *Sylvia simplex*.—This Warbler was first observed on passage on 5th September, when a single bird came under notice at the head of one of the geos. On the 25th small numbers were present along with the other migrants, and some were also seen and obtained on the following day. This species appears within brackets in the "Fauna of Shetland," as one whose occurrence in the islands requires confirmation.

BLACKCAP, *Sylvia atricapilla*.—This was one of the best represented species in the great rush of birds of passage witnessed between 23rd and 25th September. The first to come under notice was a female which entered one of the houses on the 23rd. On the 25th both sexes were quite abundant, and a few tarried, or fresh birds arrived, down to the 28th, when the last of them was observed. One of the males obtained was an interesting immature specimen in which the head was a mixture of black and brown feathers.

WHITETHROAT, *Sylvia sylvia*.—The only example of this bird of passage was detected among standing corn on 5th September. It is possible that we missed a number of birds present in the corn during the first week of our sojourn, *i.e.* before harvest operations commenced.

WILLOW WARBLER, *Phylloscopus trochilus*.—Only a few of these birds of passage were seen until the great arrival of migrants on the night of 22nd September or the earliest hours of the 23rd, on which day, and down to the 29th, it was fairly

abundant amid the turnips and potatoes. The first of the immigrants was observed, however, on 3rd September; and the last, an immature bird, was obtained on 4th October.

YELLOW-BROWED WARBLER, *Phylloscopus superciliosus*.—Among the most interesting of the many migrants which came under our notice on 25th September was a male of this pretty little Siberian species. This I had the good fortune to obtain among a patch of potatoes. I found it by no means a confiding bird, but, on the other hand, an extremely restless one; and though I recognised it at once, I was for a time very doubtful if I should succeed in securing it for the Museum collection. The only previously known Scottish specimen was obtained within sight of Fair Isle, namely, at Sumburgh Head, Shetland, and at an almost identical date, so far as the day and the month are concerned, *i.e.* on 24th September 1886.

REDBREAST, *Erithacus rubecula*.—The first Redbreasts were observed on the morning of 23rd September; when a number were seen singly in all parts of the island. These immigrants were remarkably wild, and would not permit of a close approach. A further arrival was manifest on the 25th, when not a few skulked among the cover afforded by the turnips and potatoes, while others were found in the wilder portion of the island. After this date a few were seen down to the end of September, and one on 4th October. This species, according to the Fauna, appears to be a very uncommon bird in the Shetlands.

BLUETHROAT, *Cyanecula suecica*.—A young male of the year was obtained by Kinnear, among cabbages, on 25th September; being one of the rarer species which participated in the great movement witnessed on that day. This bird is new to the fauna of the Northern Isles, not having been previously detected in either the Shetland or Orkney groups. This interesting specimen has been presented to the collection of Scottish birds in the Royal Museum, Edinburgh, by its fortunate captor.

(*To be continued.*)

LAND AND FRESHWATER MOLLUSCS OF ST. KILDA.

By JAMES WATERSTON, M.A., and J. W. TAYLOR.

A CONSIDERABLE portion of the time given to field work was spent on this group, with the result that a relatively large number of species was taken. St. Kilda was at a com-

paratively recent time connected with the Outer Hebrides, from which it is now separated by a somewhat shallow stretch of sea. Some interest therefore attaches to the comparison of the present list, with one¹ made a little previously at Balclona, N. Uist, in a locality directly opposite St. Kilda. This is the nearest point (36 miles) to the more outlying island, which it resembles in general conditions.

Numbers indicate the occurrence of the species during the month, June 10 to July 10.

ARION ATER, *L.*—Occurs everywhere in profusion. On the hillsides and in drier situations generally the type was dominant; elsewhere, especially in marshy spots, several lighter forms occurred.

Vars. *brunnea* (common) and *marginata* occurred. Nearly mature whitish and yellowish examples were not infrequent, but in all the darker tinge had begun to appear dorsally. These were probably forms of vars. *albolateralis* and *bicolor* or sub-var. *Scharfii*.

ARION SUBFUSCUS, *Drap.*—(2). One perfectly adult, moist ledge at back of Connacher. Again, 8/7'05, near village.

ARION HORTENSIS, *Fér.*—Common in damp situations and under cow droppings.

ARION INTERMEDIUS, *Normand.*—Fairly common, varying greatly in size. Like the preceding species it favoured the under surface of cow droppings, doubtless on account of the fungoid growths there.

AGRIOLIMAX AGRESTIS, *L.*—Generally common.

AGRIOLIMAX LÆVIS, *Müll.*—Seen frequently at foot of Mullachs Mhor and Connacher during early part of the month; not again till 8/7'05.

LIMAX ARBORUM, *B. Ch.*—The slug of St. Kilda. Swarms in all situations from sea level to the highest rocks. After heavy rain in countless numbers on every wall in the village. Frequents the sheer cliff faces down almost to the nesting ledges of the Guillemot.

Var. *nigra.*—(2). Back of Connacher; mouth of Avon Mhor.

VITRINA PELLUCIDA, *Müll.*—After much searching dead mature shells were discovered on narrow ledge down the cliff face on N.W. Very immature living examples also occurred here; adult never seen alive.

¹ See Zoological Notes of present issue.

HYALINIA CELLARIA, Müll.—Under stones in and at door of prehistoric subterranean dwelling, "The Fairies' House."

HYALINIA ALLIARIA, Miller.—The commonest land shell.

Var. *viridula*, equally abundant.

HYALINIA NITIDULA, Drap.—Infrequent. Fairies' House, Connacher, Oisaval.

HYALINIA RADIATULA, Alder.—(2). One from southern slope, Connacher. Another detected later.

HYALINIA CRYSTALLINA.—Rather scarce. Ruaval, cliff side of Connacher.

HELIX ROTUNDATA, Müll.—Common on rock débris, showing a tendency to the var. *pyramidalis*.

PUPA CYLINDRACEA, Da Costa.—Singly and in small colonies everywhere, all the edentulous form and probably the same as the *Pupa sempronii* of Switzerland.

PUPA ANGLICA, Fér.—(2). On talus of Connacher; *ibid.* Mullach Mhor.

VERTIGO SUBSTRIATA.—(6). A small colony under stones in sheep pen near foot of Mullach Sgail.

VERTIGO EDENTULA, Drap.—(2). Adult and immature, loose stones southern slope, Mullach Mhor.

BALEA PERVERSA, L.—(1). In company with *Vertigo substriata*.

COCHLICOPA LUBRICA, Müll.—(4). In company with *V. substriata*, Oisaval.

Var. *lubricoides*, near village.

PISIDIUM PUSILLUM, Gmel.—Very abundant in marshy ground at the foot of Avon Mhor, referable to var. *obtusale* though not strictly characteristic.

No collection was made of the marine shells, but the following Note may prove of interest. Near the top of the cliff at the passage opposite Dun (Ruaval), at a point at least 400 feet above sea level, it was surprising to find a large colony of one of our common shore species (*Littorina littorea*, L.) distributed in crannies of the rock. The only food present was a yellow lichen which clothes the cliff faces abundantly, and the height above the sea precluded the idea of an ascent between tides. All the specimens examined were immature, and the shell when handled showed a tendency to crumble round the mouth. Mr. Fraser had

noted "whelks" crawling on dykes behind the manse. Later, empty shells of the same species and of *Purpura lapilla* were found among loose stones on Mullach Mhor. The air all round Hirta is naturally saturated with brine, and at Ruaval in particular very little wind suffices to raise a fine blinding spray which may, in part, account for a remarkable change in habit.

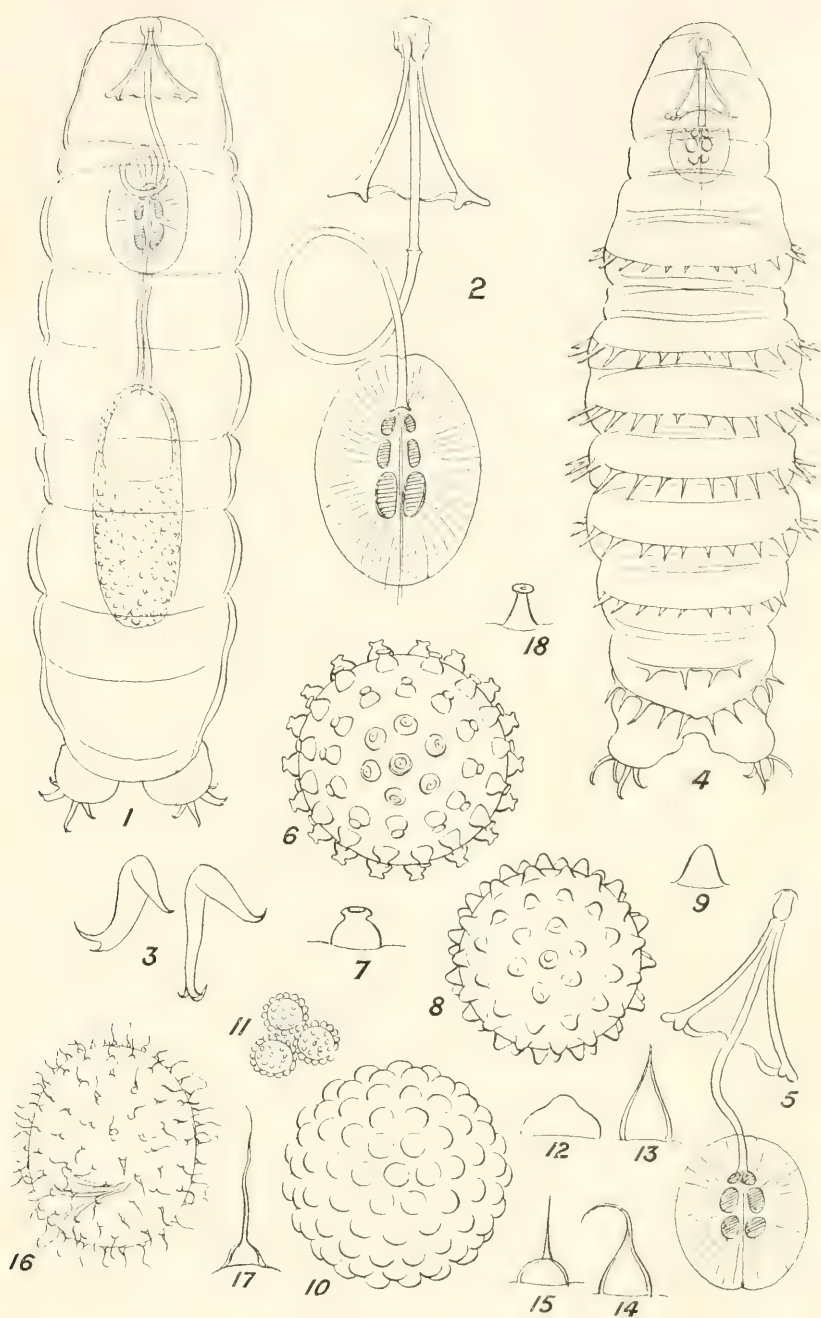
EDINBURGH.

RARE DIPTERA IN THE FORTH DISTRICT.

By A. E. J. CARTER.

THE following Diptera captured during the past season are worth noting as being either new to Scotland or of rare occurrence.

1. *Hemerodromia melanocephala*, Hal.—I took a single female of this species at Aberfoyle on 8th September. The only Scottish record I can find is one by Mr. Verrall in "Ent. Mo. Mag." 1883, p. 222, where he records it from Arran.
2. *Rhamphomyia flava*, Flin.—I captured a female, on 24th June by sweeping in the wood near Polton station. Dr. Vice records it from Orkney ("Scot. Naturalist," 1873-74, p. 274), and Mr. Verrall took it in Arran.
3. *Syntormon Zetteri*, Liv.—A single male of this rare and well-marked species was taken at Aberfoyle on 8th September. Though rare it appears to be widely distributed, as Mr. Verrall ("Ent. Mo. Mag." 1905, p. 172) gives Inveran, Golspie, and Nethy Bridge in Scotland, and the New Forest, and Landport near Lewes in England. At the latter locality two females were taken in 1867, while at the other places named only a single male occurred in each case.
4. *Campsicnemus scambus*, Fall.—This species occurred at Aberlady on 7th August, when I captured a male by sweeping. I can only find one Scottish record, "Ent. Mo. Mag." 1905, p. 194, where Mr. Verrall mentions Aberdeen as a locality. It is a very distinct species, the middle tibiæ of the male being remarkably dilated.
5. *Teuchophorus spinigerillus*, Zett.—This small Dolichopodid, which is new to the Scottish List, also occurred with the last species at Aberlady on 7th August. I captured a male and



SCOTTISH ALPINE TARDIGRADA.

female by sweeping. Previous records are all from the south of England. Cambridgeshire being the northern limit.

6. *Platypiza picta*, Mg.—I took a male at Aberfoyle on 18th September. The only previous record of this species for Scotland is that of a female taken by Col. Yerbury at Golspie on 25th August 1900, as mentioned by Verrall ("*Syrphidæ*," p. 667).
7. *Loxocera aristata*, Pz. var. *Yerburyi*, Aud.—At Aberlady on 7th August I took a well-marked specimen of this melanic variety along with two specimens of the typical form of the species—all males. I have not seen any record of the occurrence of this form since it was brought forward by Mr. Austin ("*Ent. Mo. Mag.*" 1899, p. 65) and described from specimens (4 males and 1 female) taken by Col. Yerbury at Kingussie and Nethy Bridge in July and August 1898. My specimen is very dark and exhibits no trace of the reddish colour on the hinder part of the thorax and the scutellum characteristic of the type.

MUSSELBURGH.

SCOTTISH ALPINE TARDIGRADA.

By JAMES MURRAY.

PLATE III.

THIS paper embodies the results of two visits to Ben Lawers in the summer of 1905. Mosses were gathered on the cairn and at a few places near the summit of the mountain, all above 3500 feet. The moss was washed next day and examined for Tardigrada. The result was so interesting that it is thought to justify the publication of this Note, without waiting to supplement it by work on other hills, as at first intended. The number of species found was not great. There was an undescribed species of *Diphascou*, a peculiar variety of *Macrobiotus ornatus*, and a remarkable variety of forms of eggs of *Macrobiotus*. The moss from the cairn was most productive.

A little peaty pool a few hundred feet below the summit was also very rich, and contained most of the common low-land species that were found. The highest *Sphagnum* obtained on the mountain had likewise many Tardigrada, which is contrary to my experience of *Sphagnum* elsewhere.

Here was obtained the curious *Echiniscus gladiator*, which is not at all rare in Scotland, though it has not, so far as I have heard, been got anywhere else. An egg found among this Sphagnum comes very close to *Macrobotus coronifer*, Richters (5) and (6), though the spines are of different form to those figured by Richters. If the identification be correct, we have the curious association on the summit of Ben Lawers of arctic and antarctic Tardigrada, along with many common lowland species.

Many Tardigrada are unquestionably of world-wide distribution. *Diphascon chilense*, Plate, has been found in Spitzbergen (5) and the South Orkneys, and at many intermediate places, alpine and lowland, in both hemispheres. This is however, by no means the case with all species. The Tardigrada have not in the same degree the potentially cosmopolitan character which Jennings¹ assigns to the Rotifera. *Macrobotus hufelandi* is reported from all over the world, but many of these records are unreliable, although the animal probably has a world-wide range. Scourfield's (7) *M. hufelandi*, for instance, reported from Spitzbergen, is evidently *M. echinogenitus*, Richters, though Richters afterwards did find *M. hufelandi* (Richters) in Spitzbergen. Prof. Richters further reports *M. hufelandi* (Richters, not Plate) from Possession Island in the Antarctic. On the other hand, in another part of the Antarctic region I found not a single egg of *M. hufelandi* (Richters or Plate), all the spiny Tardigrade eggs being quite peculiar. The association of Tardigrada which we find on the top of Ben Lawers, has, therefore, much greater significance than would, for instance, an association of Bdelloid Rotifera, in which we would find nothing to distinguish it from a lowland collection.

LIST OF SPECIES.

Genus ECHINISCUS.

E. arctomys, Ehr.—Several examples.

E. mutabilis, Murray (1).—Plentiful.

E. gladiator, Murray (1).—Several.

E. wendti, Richters (5).—One example. The 2-clawed larva was also found. An *Echiniscus*, which comes nearest to this

¹ "U.S. Fish Comm. Bull. 1899," p. 100.

species, was found, differing only in the shorter head seta, and the moderately large granules on the plates. A similar variation in the size of the granules has been seen in *E. mutabilis*.

E. sp.? larva. Broadest at head, plates 9 (2 median), head seta long, short curved seta at tail-piece, fringe of sharp spines on 4th leg, all claws with moderate sized curved barbs, granules of moderate size. Claws two.

Genus MACROBIOTUS.

M. hufelandi, C. Sch. (3) (6) (7).—In little peaty pool near the summit. The typical form of the egg was also in this pool (Fig. 18).

M. echinogenitus, Richters (5). According to Richters the animal is scarcely distinguishable from *M. hufelandi*. There are probably some little differences in pharynx or claws, but the opportunities for proving the connection between an animal of this section of the genus and the spiny eggs which they lay are very rare. Well-grown eggs may be seen in the body, but they are not spiny. The spines would appear to develop at a late stage, just before deposition. The commonest form of the egg, with acuminate spines curved at the top, was in the peaty pool. There was also a variety with the basal part of the spine nearly hemispherical, the points longer (Figs. 13, 14, 15).

M. ornatus, Richters (4).—Neither the type nor any of Richters' varieties was found, but a variety having many transverse rows of short, straight, equal spines (Fig. 4). It was longer than is usual, and may possibly be distinct. The pharynx and claws were typical. Length, 300 μ .

With this was a glabrous variety which I provisionally unite with this species (1, p. 691), having neither spines nor papillæ, but the typical pharynx with three roundish nuts in each row. One example had a short flexible portion of the gullet, as in *Diphascon* (Fig. 5).

EGGS OF MACROBIOTUS.

Eggs of animals of this genus were found in considerable variety. Many of them could not be assigned to any known species. The number of forms of spiny Tardigrade eggs which have already been found in Scotland compels us to suppose that there are many species still undescribed, or that the eggs are variable in form. While considerable allowance must be made for variability of the spines, my experience leads me to expect that many of the varieties will be

found to be constant. The same form turns up time and again, identical in size and shape of spines. Till something more is known about the development of these animals, from the egg to the adult, I think it would be rather unsafe to follow the precedent set by Richters when he described *M. echinogenitus* from peculiarities of the egg only.

M. hufelandi, Richters (not Plate, C. Sch.?) (Fig. 18).—If it be the case, as stated by Richters, that *M. hufelandi* and *M. echinogenitus* are indistinguishable except by their eggs, then the egg which he figures is not *M. hufelandi*, since Plate earlier figured another form, with blunt conical processes, as that of the species (3).

Macrobiotus sp. (Figs. 6 and 7).—Differs from *M. hufelandi*, Richters, in the shorter thicker processes, with bulging outline.

M. hufelandi, Plate (Figs. 8 and 9).—Although this is not identical with the egg figured by Plate, the form of the spines is the same.

Macrobiotus sp. (Figs. 10 and 11).—Processes hemispherical, set very close together. Similar to an egg figured by Richters (6, Plate V., Fig. 4) as a variety of *M. echinogenitus*, but the processes are lower.

Macrobiotus sp. (Fig. 12).—Similar to an egg figured by me (1, Plate IV., Fig. 20), but the processes relatively shorter and broader.

M. echinogenitus, Richters (Figs. 13, 14, and 15).—Fig. 13 is nearly typical; Fig. 14 is the form which appears to be commonest in Scotland, the points longer and curved; Fig. 15 appears to be a modification of the egg of this species, a hemispherical basal portion bears a sharp, straight spike.

M. coronifer, Richters (Figs. 16 and 17).—The most interesting of the eggs found on Ben Lawers. It differs from all other spiny *Macrobiotus* eggs in that it is oval, while they are spherical. Richters (5 and 6) says that the eggs are covered with small weak spines. The Ben Lawers egg agrees in this respect, but the form of the spines differs from those figured by Richters (6). They are shown as small, straight spikes, evenly tapering and without expanded basal portion. Ours have a minute hemispherical base, on which rises a very slender undulate seta. The egg contained a living young, with well-developed teeth, but the pharynx was not clearly seen. With the exception of this egg, none of Richter's species which possess the circlet of spines at the base of each claw, have yet been seen in this country.

Diphascon alpinum, n. sp. (Figs. 1 to 3).

Specific characters.—Whitish, narrow, of nearly equal width throughout. Teeth curved, divergent; gullet slender, very long. Pharynx broad, oval, or thromboid, short diameter to long as 8 to 11; 3 rods in each row increasing both in length and thickness from first to third. The claws, a larger and a smaller pair, one claw of each pair longer and with a supplementary point. The claws are thicker than in the other species, the larger claw of the smaller pair especially. Length over all 250 μ .

The general form is most like *D. spitzbergense*, Richters (5), and the pharynx is of about the same relative length and breadth. The resemblance goes no farther. *D. spitzbergense* has a thicker, shorter gullet, longer and thinner claws, and the arrangement of rods in the pharynx quite different. *D. angustatum*, Murray (1), has quite a different form, broadest at third legs and tapering to a kind of snout, nearly straight slightly divergent teeth, thick gullet, narrow pharynx with a different arrangement of rods.

The other three species agree with *D. alpinum* in having a slender gullet, but all have longer claws and differ in many points. *D. chilense* (3) has nearly circular pharynx and more numerous rods, not increasing in size. *D. bullatum* (2) has papillose and embossed skin, rounder pharynx and quite different rods. *D. scoticum* (2) is at once distinguished by the narrow pharynx and slender straight parallel rods.

The species is thus seen to differ conspicuously from all the previously described species in the genus, the arrangement of rods in the pharynx and the characters of the claws being enough to mark it as a good species.

In moss from the cairn on Ben Lawers, very abundant, July 1905. On a second visit in September of the same year, not an example could be found.

It is of great interest that the same animal, identical in all respects, has been found in abundance in moss brought by the Scottish Antarctic Expedition from the South Orkneys, and kindly given to me by Mr. R. N. Rudmose Brown.

Diphascon scoticum, Murray (2).—This species, apparently the commonest of the genus in Scotland, was plentiful in the September collection. The peculiar lenticular bodies (nuclei?) in the stomach wall are characteristic for the species. From the Ben Lawers examples I ascertained a feature overlooked in the original description, viz., that the longer claws of each pair have very fine supplementary points. This character, general or universal in *Macrobiotus*, appears to be general also in this genus, and is even found in the long single claws of *Milnesium*.

Diphascon chilense, Plate (3).—A single example on the cairn in July.

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EXPLANATION OF FIGURES.

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|---|--|
| 1. <i>Diphascon alpinum</i> , n.sp. | 10. Egg of <i>Macrobiotus</i> , sp.? |
| 2. <i>Diphascon alpinum</i> , teeth, gullet, and pharynx. | 11. Some processes of the same. |
| 3. <i>Diphascon alpinum</i> , claws. | 12. Single spine of egg of <i>Macrobiotus</i> , sp.? |
| 4. <i>Macrobiotus ornatus</i> , Richters, variety. | 13. Single spine of egg of <i>M. echinogenitus</i> , typical. |
| 5. <i>Macrobiotus ornatus</i> , variety with flexible gullet. | 14. Single spine of egg of <i>M. echinogenitus</i> , common variety. |
| 6. Egg of <i>Macrobiotus</i> , near <i>M. hufelandi</i> , Richters. | 15. Single spine of egg of <i>M. echinogenitus</i> , ? variety. |
| 7. Single spine of the same. | 16. <i>M. coronifer</i> , ? Richters. |
| 8. Egg of <i>M. hufelandi</i> , Plate. | 17. Single spine of the same. |
| 9. Single spine of the same. | 18. <i>M. hufelandi</i> (Richters), typical. |

LAKE SURVEY OFFICE, EDINBURGH.

TWO SPECIES OF KOELERIA NEW TO SCOTLAND.

By G. CLARIDGE DRUCE, M.A., F.L.S.

DR. DOMIN of Prag has recently published a very interesting work entitled 'Fragmente zu einer Monographie der Gattung Koeleria' in "Ungarische Bot. Blatter," III., 1904, Nos. 6-12, of which I have given a brief account in the "Journ. Bot." for last December. Dr. Domin has recently examined my herbarium and he recognises in it KOELERIA GLAUCA, DC., sub-species K. ARENARIA, Dumort. (K.

albescens, DC., var. *glabra* DC.), which I have collected at Golspie in East Sutherland; Tain, East Ross; Findhorn, Elgin; Fifeshire (*C. Bailey*), etc. It is thus described in the "Fragmente":—*Laxe cæspitosa multiculmis minus glauca humilior sæpius solum 10-20 cm. alta, rhizomate interdum prorepenti, foliis radicalibus numerosis angustis convolutis brevibus (3-6 cm.) rigidis glaberrimis sæpe curvatis, vaginis infimis pallidis, folio culmco plerumque unico, lamina brevi recta 1-2 cm. longa, vaginis typice puberulis, culmis glabris haud raro totis pubescentibus, panicula densa contracta pro more haud interrupta circa 3-5 cm. longa, spiculis minoribus solum 4-4.5 mm. longis, glumella obtusiuscula interdum quoque acutata.*" It occurs, although rarely, on maritime sands in northern and western France, as at Cherbourg, and is said to be frequent in the islands of Borkum, Juist, Romö, etc., on the north and west coast of Friesland. The most interesting plant is, however, the one which for the greater part we have in Britain been calling *Kæleria cristata*. Dr. Domin says that although a very large mass of material from various localities has been under his observation, he has seen nothing identical with this British plant. On some sheets in the National Herbarium Dr. Domin has marked it as sub-species *villosula*. From the wider range of material which I have been able to send him he now thinks it to be a good geographical sub-species, for which he suggests the more appropriate name *K. BRITANNICA* diagnosed as follows:—"Pro more laxiuscule cæspitosa rhizomatibus sæpe prorepentibus vel tenuibus vaginis siccis pallidis longe involucretis, culmi humilioribus vel altioribus totis ± pubescentibus (mox, præcipue sub panicula, manifeste villosulis, mox tantum brevissime tenuiter puberulis), foliis brevioribus vel longioribus semper angustis planis usque setaceo-convolutis + molliter hirsutis numquam rigidis, vaginis dense molliter pubescentibus culmum laxè ambientibus vel subpatentibus suprema pro mire minus dense et breviter vestita subinflata, panicula - lobata, spiculis bifloris rarissime trifloris c. 4 mm. longis pubescentibus puberulisve raro fere glabris, glumis sæpius acutis (nec acuminatis), glumellis haud raro aristulatis, flosculis e glumellis parum excedentibus." I have it in my herbarium from Ballater, S.

Aberdeen; Boat of Garten, Inverness; Findhorn, Elgin; Sands of Barry and near Arbroath, Forfar; and Arthur's Seat, Edinburgh; and I have seen specimens named by Dr. Domin in the National Herbarium from Invercauld, A. Croall; Orkneys, E. S. Marshall; Isle of Man, G. Holt. Dr. Domin says that this plant is highly critical, its systematic position causing great difficulty on account of the great variability of most of the examples. It often vividly recalls *K. albenscens*, but otherwise by a series of forms is united with *gracilis*, as is well shown in my series on shingle from Lydd in Kent. It is not impossible that it frequently appears as a hybrid *gracilis* \times *albenscens*.

K. GRACILIS, *Pers.*, "Syn." i. 97 (1805), is probably the more frequent English plant. Dr. Domin diagnoses it as follows: "Dense cæspitosa, vaginis vetustis indivisis pallidis, \pm glauca (præcipue formæ glabrescentes sæpe conspicue glaucovirescentes), humilis vel elata, culmis gracilibus pro more etiam sub panicula glabris, foliis sæpe brevioribus rigidiusculis, vaginis \pm molliter pilosis rarissime glabris, laminis angustis sæpe convolutis vix plus 2 mm. latis sæpe in facie pubescentibus, ligulis brevibus sæpe exauriculatis, panicula rarissime dense cylindrica sæpius inferne subdilata interruptaque pallida nitenti, ramis ramulisque tenuibus spiculis angustioribus lanceolatis bifloris minutis solum 3-5 mm. longis." At present I have no Scottish record for this, but it is widely distributed in England, especially on calcareous soil in the southern midlands.

We have also in England *K. gracilis*, var. *gypsacea*, Domin, which I gathered on Durdham Downs, Gloster, W., in 1879 (hitherto known only from Nordhausen in Germany), and var. *latifolia*, Domin, from Surrey, the latter a broad-leaved hydrophytic form.

Dr. Domin confirms the naming of my Uphill plant *K. vallesiana*, Aschers and Graebn (= *K. splendens*, Druce, in "Journ. Bot.," Nov. 1905, not of Presl.) and also of *K. albenscens*, DC., which I gathered on the Quenvais in Jersey in 1877.

Dr. Domin also describes

K. GLAUCA, DC. "Hort. Monsp." 116 (1813). Sub-species *K. intermedia*, Ahlquist, "Fl. Tunsten," 7 (1815) non Guss.,

which chiefly differs by its bulbous rhizome, and very short radical leaves, appears to be limited to Oeland; but should be searched for on the Fife, Forfar, and Aberdeenshire coasts.

I should be glad to forward any specimens of *Kœleria* to Dr. Domin for his critical opinion. They may be sent to me at 118 High Street, Oxford.

It may be observed that *K. ciliata*, Kern., which is the *K. cristata* of European authorities for the greater part, does not appear to occur in Britain.

Our British *Kœleria* are, therefore:—*K. SPLENDENS*, Druce (*K. valesiaca*, Gaud.); *K. GRACILIS*, Pers. (*K. nitida*, (Lam.)); var. *latifolia*, Domin; var. *gypsacea*, Domin; \times *supra-arenaria*, Domin (*gracilis* \times *arenaria*); *K. BRITANNICA*, Domin (as a sub-species); *K. ALBESCENS*, DC.; *K. ARENARIA*, Dum.

OXFORD.

ADDITIONS AND CORRECTIONS TO THE TOPOGRAPHICAL BOTANY OF SCOTLAND.

By JAMES W. H. TRAIL, A.M., M.D., F.R.S.

(Continued from No. 56, Oct. 1905, p. 235.)

RUBUS.

Of this genus I gave a very full revision of the records from Scotland in this Journal (1902, pp. 170-176, 233-244; 1903, pp. 41-47, 103-107), in the light of the information contained in the Rev. W. Moyle Rogers' very valuable "Handbook of British Rubi." Instead of indicating below the additions to our knowledge of the *Rubi* of Scotland since they were discussed in "Topographical Botany of Scotland" in April 1898, I subjoin an abstract of what is at present on record about their distribution. The numbers of the vice-counties that follow the names of species and varieties are grouped to indicate their trustworthiness as records. Those in ordinary type and not enclosed are accepted by Mr. Rogers as absolutely trustworthy. Those in ordinary type in round brackets, thus (73), he accepts as practically trustworthy, though he has not seen examples in or from such districts. Those in ordinary type in square brackets, thus [73], indicate that he notes such records, but considers them as much in need of confirmation. Numbers in italics not in brackets denote forms not verified by Mr. Rogers, but

fully trustworthy. Those in italics within square brackets denote records in one of three works, according to the letter they follow, E standing for Ewing's "Glasgow Catalogue of Native and Established Plants," H for Henedy's "Clydesdale Flora," and S for Sonntag's "Flora of Edinburgh." Square brackets enclosing the name of any plant denote that the evidence of its existence within Scotland is at least not proved.

Rubus idæus, L. Every district from 72 to 112.

var. obtusifolius (Willd.). Very local, 72, 85, 86, 92, 93, (89), [88].

var. asperimus (Steele). The white-fruited raspberry is recorded by Mr. Rogers only from 87, but is not infrequent in other vice-counties, *e.g.* 91, 92, 93. He says, "It may well be a generally, though only thinly, distributed form, and usually, if not exclusively, of garden origin." I have seen it in woods, in peat-mosses, and in other situations where it certainly had not owed its presence to human action; but of course birds might have carried the seeds from gardens.

R. fissus, Lindl., 72, 77, 86, 87, 88, 90, 91, 94, 95, 96, 97, 105, 106, 111, [73, 75, 89, 92, 98, 99].

R. suberectus, Anders., 86, 87, 88, 96, 97, 98, 101, 105, (73), [72, 74, 76, 81, 89, 90, 92], [E. 75 (?), 99 (?)], [H. 77, 100], [S. 83, 85].

R. Rogersii, Linton, 75, 76, 80, 81, 86, 87, 88, 91, 94, 95, 96, 98, 99, 100, 105, 106, 107.

[*R. sulcatus*, Vest., 89, 101.]

R. plicatus, Weihe and Nees, 74, 75, 76, 86, 87, 88, 91, 92, 94, 96, 97, 98, 99, 103, 104, 105, 107, (102, 106), [72, 77, 81, 89, 90, 100].

var. hemistemon (P. J. Muell.), 86, 95, 96, 106, 109, [88, 89, 92].

R. nitidus, Weihe and Nees, 97, 99, [88].

subsp. opacus, Focke, [107].

R. affinis, Weihe and Nees. Recorded from numerous vice-counties, [77, 87, 88, 89, 72, 73, 74, 76, 83, 86, 94, 95, 97, 98, 100, 103, 105]; but the true *R. affinis* was not understood in Britain until recently, and the records cannot be trusted.

R. latifolius, Bab., 84, 88, (83, 89, 92, 97).

[*R. imbricatus*, Hort., 88, 89. Probably not found in Scotland.]

R. carpinifolius, Weihe and Nees, 97, 98, 103, 105, (93), [88, 89, 72, 100 (?), 110], [H. 77, 100], [S. 83, 85].

R. incurvatus, Bab., 74, 87, 88, 105, (77, 89, 110), [S. 82, 83, 84], [H. 98, 100].

R. Lindleianus, Lees, 75, 76, 86, 87, 88, 89, 90, 97, 98, 99, 100, 101, (72, 74).

- R. rhamnifolius*, *Weihe* and *Nees*, 74, 75, 76, 85, 86, 87, 98, 100, (73, 88, 89, 92, 95), [72, 97 error, 101, 105].
subsp. *Bakeri*, *F. A. Lees*, 86, 98, 101.
- R. nemoralis*, *P. J. Muell.*, 87.
var. *glabratus*, *Bab.*, 86, [85].
- R. Scheutzii*, *Lindeb.* Often abundant in Scotland, less so in England, 73, 74, 75, 76, 86, 87, 88, 96, 97, 98, 99.
- R. dumnoniensis*, *Bab.* (1890), 97, 98, 100, 101, 103, 106.
- R. pulcherrimus*, *Neum.* Formerly named *R. umbrosus* by most British botanists. Often common, 73, 74, 75, 76, 87, 88, 97, 98, 99, 100, 101, 103, 104, 105, 110, [72].
- R. Lindebergii*, *P. J. Muell.* Used to be included with last as *umbrosus*. 75, 85, 87, 88.
- R. villicaulis*, *aggr.* Recorded from numerous vice-counties in Scotland, but often without distinction of forms, [E. 77 (?), 99, 101 (?)], [H. 77, 100].
subsp. *villicaulis*, *Koehl.* (including *var.* *insularis*, *F. Aresch.*). 72, 84, 86, 87, 88, 93, 95, 96, 97, 98, 100, 104, 105, 106, 107, 108, 110, [89, 103].
subsp. *Selmeri*, *Lindeb.*, 73, 74, 75, 76, 80, 81, 84, 86, 87, 88, 89, 96, 97, 98, 99, 100, 101, 103, 105, [77, 95, 106, 104].
[subsp. *calvatus*, *Blox.*, 105.]
subsp. *rhombifolius*, *Weihe*, 87, [88, 110].
- R. gratus*, *Focke*, 87, 99, 104, 110, [88, 89].
[R. *ramosus*, *Briggs*, 88, 89.]
- R. thyrsoides*, *Wimm.*, 93, [92].
- R. argentatus*, *P. J. Muell.*, 74.
- R. rusticanus*, *Merc.* (= *R. discolor*, auct.). Not frequent in Scotland. 74, 75, 89, 91, 100, 110.
[R. *pubescens*, *Weihe*, E. 103.]
- [R. *macrophyllus*, *aggr.* Reported from 72, 81, 84, 86, 87, 88, 92, 95, 96, 97, 98, 100, 105, 106.]
- R. macrophyllus*, *Weihe* and *Nees*, 72, 76, 86, 87, 97, 98, 100, [81, 88, 89, 92, 95, 105], [E. 102], [H. 77].
subsp. *Schlechtendalii* (*Weihe*), 74, 98, 106, (84, 96), [87].
var. *macrophylloides* (*Genev.*), 88, 98.
var. *amplificatus* (*Nees*), (72, 88, 100), 89.
- [R. *Salteri*, *Bab.*, 88, 89.]
[R. *Colemani*, *Blox.*, 89.]
- R. Sprengelii*, *Weihe*, 73, 74, [89].
- [R. *micans*, *Gren.* and *Godr.*, 88, 107.]
- R. hirtifolius*, *M.* and *Wirtg.*, 96.
var. *danicus*, *Focke*, 74, 77, 86, 87, 88, 89, 95, 96, 97, 98, 103, 108, [102].
[var. *mollissimus*, *Rogers*, 108 error.]

- R. pyramidalis*, *Kalt.*, 74, 75, 87, 88, 96, 97, 98, 100, 105, [89, 103 error].
- R. leucostachys*, *Schleich.*, 107, (81), 105.
[*R. Boræanus*, *Genev.*, 97.]
- R. cinerosus*, *Rogers* (1896), 98.
- R. mucronatus*, *Blox.*, 84, 85, 86, 87, 88, 89, 91, 92, 93, 96, 97, 98, 99, 100, 103, 104, 105, 106, 107, 110, (81, 82, 102), [H. 77].
- R. Gelertii*, *Frider.*, 106.
- R. anglosaxonicus*, *Gelert.*
subsp. raduloides, *Rogers*, 74.
- R. melanoxyton*, *M. and Wirtg.*, 75, 76, 86, 87, 88, 93, 94, 95, 96, 98.
- R. infestus*, *Weihe*, 74, 75, 76, 86, 87, 88, 94, 97, 98, 99, 100, (23), [72].
[*R. Borreri*, *Bell-Salter*, 74.]
- R. Drejeri*, *G. Jens.*, 86, 87, [88].
- R. radula*, *aggr.* Not in *Rogers'* "Handbook." 72, 73, 80, 85, 89.
- R. radula*, *Weihe*, 74, 75, 81, 84, 85, 86, 87, 88, 90, 93, 94, 95, 99, 103, 104, 105, 106, 107, 110, [72, 73, 79, 83, 89, 91], [H. 77, 100].
subsp. anglicanus, *Rogers*, 87, 99, 101.
subsp. echinatoides, *Rogers*, 84, 86, 87, 88, 92, [98].
subsp. sertiflorus (*P. J. Muell.*), 76, 87, 98, 99, 101.
- R. echinatus*, *Lindl.*, 86, 99, (76, 81, 88, 89, 95), [H. 100], [S. 83].
- R. oigocladus*, *M. and Lefv.*
var. Newbouldii. (Mr. Rogers has recently shown that Babington's *Newbouldii* is not distinguished from *R. Drejeri*, but proposes to retain the name for this variety of *oigocladus*). 85.
- [*R. Babingtonii*, *Bell-Salter*, 89.]
- [*R. Lejeunei*, *Weihe and Nees*, 89.]
- [*R. cavatifolius*, *P. J. Muell.*, 88, 89.]
- [*R. "humifusus"*, 72 and 87, "Top. Bot."]
- [*R. thyriger*, *Bab.*, 104.]
- R. foliosus*, *Weihe and Nees*, 93, 94, [89].
- R. rosaceus*, *Weihe and Nees*, (88, 89), [E. 97, 110].
var. hystrix, *Weihe and Nees*, 74, [88, 89].
- [*R. fuscoater*, *Weihe*, E. 98 (?).]
subsp. infecundus, *Rogers*, 97, 99.
[*subsp. Purchasianus*, *Rogers*, 91, 92.]
- [*R. Koehleri*, *Weihe and Nees*, 87, 88, 89, [72, 73], [E. 98 (?), 99 (?), 100 (?)], [H. 76, 100], [S. 83, 84, 86].
subsp. dasyphyllus, *Rogers*, 80 (Druce).
var. pallidus, *Bab.*, 73, 74, 75, 76, 87, 94, 98, 100, (72, 88 (?), 89), [E. 99 (?)].

- [*R. plinthostylus*, *Genev.*, 73, very doubtful.]
 [*R. glandulosus*, *Bell*, *H.* 98, 100; *S.* 82, 83, 86.]
 [*R. serpens*, *Weihe*, and *var. rivularis*, *M.* and *Wirtg.*, 86.]
 [*R. hirtus*, *W.* and *K.*, 73.]
 [*R. saxicolus*, *P. J. Muell.*, 87.]
R. ochrodermis, *A. Ley*, 80.
R. dumetorum, *Weihe* and *Nees* (excluding varieties), 106.
 var. ferox, *Weihe*, 81.
 var. britannicus, *Rogers*, 86, 87, 88.
 var. diversifolius (*Lindl.*), (89, 106), [86], [*H.* 100].
 var. tuberculatus, *Bab.*, (88, 89), [86], [*H.* 76, 77], [*S.* 83].
 [*var. fasciculatus*, *P. J. Muell.*, 88, 89, 100.]
R. corylifolius, *Sm.*, aggr., 72, 73, 74, 75, 76, 77, 81, 84, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 100, 101, 104, 106, 107, 109, 110, 83, 105, [*E.* 98 (?), 99 (?), 102 (?), 103 (?)].
 var. sublustris (*Lees*), 75, 86, 88, 104, (73, 74, 77, 89, 91, 92, 94).
 var. cyclophyllus, *Lindeb.*, 75, 76, 93, 101, (74, 86, 89, 91, 92, 100), [88].
R. Balfourianus, *Blox.*, 81, 108, (89), [88, 73, 107].
R. cæsius, *L.*, 74, 75, 76, 80, 84, 85, 86, 87, 88, 91, 109, [73, 81, 83, 89 (?)], [*E.* 77 (?), 97 (?), 98 (?), 99 (?), 100 (?), 101, 110 (?)], [*H.* 77], [*S.* 83]. Mr. Rogers says of this: "Probably present in every county of the British Isles"; but I have never seen it in the counties near Aberdeen. The record for 91 requires to be confirmed before it can be accepted as satisfactory.
R. saxatilis, *L.*, 72-77, 79-81, 83, 85, 87-112, 86.
R. Chamæmoris, *L.*, 77-80, 83, 86-98, 105-109, 72, 81 (75, 99).
 [*R. arcticus*, *L.* Recorded in "English Botany," ed. i., as found in East Perth (Ben-y-Gloe), and 103 (Mull); but the records are not now regarded as trustworthy.]
Dryas octopetala, *L.*, 107 (109 ?).
Geum intermedium, *Ehrh.* (*rivale* × *urbanum*), 92, 105.
G. macrophyllum, *Willd.*, 93, casual. Well established in two or three places in 92.
Potentilla norvegica, *L.* Little more than a casual, 83, 86, 92.
P. recta, *L.*, casual in 83, 92.
P. verna, *L.*, 86 ("Carron Ironworks," Sonntag, ? casual).
P. rubens, *Vill.*, 94.
P. procumbens, *Sibth.*, 75, 94, 96, 97, 101 (112 ?).
P. reptans, *L.*, 84, 97, 98 (?), 101 (instead of 100, which must be deleted), (105 probably in error). This scarcely appears to be native near Aberdeen, though occurring where it had probably escaped from former cultivation or been introduced.

- P. Anserina*, *L.* This species varies greatly in degree of hairiness. Plants that had the upper surface of the leaves covered with pale hairs when growing in damp hollows among sand dunes (as in *var. sericea*), when cultivated in good soil in a garden in Old Aberdeen in two years had the upper surface of the leaves bright green, and almost hairless (*var. discolor*).
- P. fruticosa*, *L.*, 87 ("Dollar," Sonntag).
- P. palustris*, *Scop.*, *var. villosa*, 81 and 82 (*Druce*).
- Alchemilla vulgaris*, *L.*, *var. pratensis* (*Schmidt*), 73, 75, 76, 91, 93, 94, 95, 96, 97, 103, 104, 109.
var. alpestris (*Schmidt*), 73, 75, 76, 80, 81, 83, 89, 90, 91, 93, 94, 95, 104, 109, 111. *Delete* 84.
var. filicaulis, *Buser*, 73, 76, 81, 88, 90, 92, 97, 98, 99, 108.
- A. argentea*, *Lam.*, 84†.
- Agrimonia Eupatoria*, *L.*, 84, 101.
- A. odorata*, *Mill.*, 85, 101. (Reported by Sonntag from 82, 83, 84, 85.)
- Aremonia agrimonioides*, *DC.*, 88.
- Poterium Sanguisorba*, *L.* *Delete* 74.

ROSA.—To this numerous records have to be added since April 1898, chiefly as the result of more recent work in the field (several papers having appeared in this Journal), but also from the investigation of herbaria and of local lists. In these last the names are often not to be trusted in so critical a group as the Roses, and the subjoined additions are confined to those believed to be trustworthy. They are arranged under the scheme of M. Crepin, as set forth by Mr. Barclay, and followed in my second list ("Ann. S.N.H.," 1898, p. 167).

- Rosa pimpinellifolia*, *L.*, *f. spinosissima*, *L.* Recorded for all *except* 76, 77, 99 (111?), 112; probably occurs in all except 112 and 111 (?).
- R. involuta*, *Sm.* Under this name the hybrids of *spinosissima* with *tomentosa* or *mollis*, probably the former, have been recorded in 1900 from 91 and 93.
- R. p. f. spinosissima* × *rubiginosa*. In several places in North Aberdeen (93), and in Banffshire (94), in gardens and byroads. Mr. Barclay regards this as an escape from cultivation where found in 93 and 94; but he has found it as a natural hybrid with the parent species by the Tay at Caputh, in Perthshire.
- R. hibernica*, *Sm.* (*R. canina* × *spinosissima*), 93, 94. One large cluster in each locality, possibly introduced.
- R. rubiginosa*, *L.*, 90 to 96, 109†. In N.E. Scotland this frequently appears entitled to be regarded as native, if one may judge by habitats. It has long been a favourite, and has often been planted, even in early times; and its seeds are readily dispersed

by birds. It is, therefore, often regarded as very doubtfully "indigenous" in Scotland; but the evidence now obtainable can warrant only the verdict "not proven."

R. canina, *L.*, *var. lutetiana*, *Leman*, 80, 93, 94.

var. dumalis, *Bechst.*, 91, 93.

var. dumetorum (*Thuill.*), 80, 92, 93, 95.

R. glauca, *Vill.*, 80, 81, 91, 92, 93, 94, 95, 96, 97.

var. coriifolia (*Fr.*), 81, 91, 92, 93, 94, 96, 97, 98.

var. subcoriifolia, *W. Barclay* (1899), 79, 86, 87, 89, 92.

R. arvensis, *Huds.*, 85.

R. alpina, *L.*, 91.

Pyrus torminalis, *Ehrh.* Sonntag says of this, "common in plantations," but this requires confirmation. The record for 106† was afterwards referred by its recorder (Rev. E. S. Marshall) to "*P. latifolia*, *Syme.*" Syme (in "*E. Bot.*," iii. p. 242) says, "In Scotland it (*P. torminalis*) only occurs in ornamental plantations," and that "*Sorbus latifolia*, *Persoon*, the connecting link between *P. torminalis* and *P. Aria*, does not occur in Britain."

P. Aria, *Ehrh.*, 84, 89, 101, 105, 109†. I have never seen this where I could regard it as clearly indigenous in Scotland, but it is frequent in plantations, and where it might readily have sprung up from seeds dispersed by birds.

P. intermedia, *Ehrh.*, 74†, 92†, 97†, 107†.

(Professor Koehne in 1897 discussed, in a paper read before the Edinburgh Botanical Society, the curious forms of *Pyrus* found in Arran, and referred all to hybrids between *Aria suecica*, *Koehne*, and *Sorbus Aucuparia*, or to *S. Aucuparia*. The true *suecica* he had not seen from Arran, but from Glen Catacol two examples of the true hybrid, called by L. and W. Koch *Sorbus hybrida*, and by C. Koch *S. fennica*, the other intermediates being regarded as crosses between the hybrid and *suecica*. He suggests that forms may be expected between the hybrid and *Aucuparia*, indicated by the upper pinnæ alone being slightly fused or decurrent, the lower remaining quite separate.)

P. Aucuparia, *Ehrh.*, 84.

Cratægus Oxyacantha, *L.*, *var. oxyacanthoides* (*Thuill.*), 86.

SAXIFRAGACEÆ.

Saxifraga oppositifolia, *L.*, 107.

S. nivalis, *L.*, 83 ("111, Macgillivray," Ewing's "Glasgow Catalogue").

S. stellaris, *L.*, 77 ("Gl. Cat.").

S. Geum, *L.*, casual or planted in 75, 77, 83, 84, 85, 100, and probably many other vice-counties.

- S. umbrosa*, L., casual or more often planted originally in woods and pleasure grounds; 75, 77, 83, 90, 91, 93, 98, 102, and no doubt in many other vice-counties.
- S. tridactylites*, L., 102.
- S. granulata*, L., 106? For III (?) read III†.
- S. Sibthorpii*, Boiss. and Sprun., 98, escape.
- S. hirta*, Haw., 86, 89, 90, 108.
- S. hypnoides*, L. The record for III requires to be confirmed.
- Tellima grandiflora*, R. Br., casual in 83.
- Ribes Grossularia*, L. Very frequent in most districts, and often where it might seem to be indigenous, but there is reason to regard it as spread by birds from gardens.
- R. alpinum*, L. Occasionally met with more or less naturalised, 87, 88, 91, 99, 109.
- R. rubrum*, L. The aggregate has been recorded from numerous vice-counties, the cultivated form (*sativum*, Reichb.) being frequently scattered by seeds carried by birds from gardens.
- R. nigrum*, L., is also of very frequent occurrence in an apparently wild state as the result of the distribution by birds (but in recent years it has suffered much from attacks of mites galling the buds), 75, 76, 77, 83, 85, 86, 87, 88, 89, 93, 94, 98, 99, 101, 105.

CRASSULACEÆ.

- Sedum Telephium*, L. The var. *Fabaria*, H. C. Watson, appears to be the usual form in Scotland, being frequent by walls, roads, fields, etc., in many places, under conditions that point to its having owed its being in the country to man, 93†, 94†, 99†, 102†, 105†.
- S. villosum*, L., 96.
- S. album*, L., 83, 90. Recorded by Sonntag from 82, 84, 85, no doubt introduced.
- S. anglicum*, Huds., 92, now extinct; may have been introduced where found.
- S. elegans*, Lej., escape.
- S. reflexum*, L., 105.
- S. spurium*, M. Biebr., 83 casual.
- S. stoloniferum*, Gmel., 92 casual.
- Sempervivum tectorum*, L. Usually planted on roofs of houses, 75, 77, 81, 82, 83, 86, 90, 93.

DROSERACEÆ.

- Drosera anglica*, Huds., 97, 102.
- D. anglica* × *rotundifolia* (*D. obovata*, M. and K.), 93, 97, 106.
- D. intermedia*, Hayne, 103. Delete 95 and 105.

HALORAGACEÆ.

Hippuris vulgaris, *L.*, 106.

Myriophyllum verticillatum, *L.* Recorded with doubt for 72, 95, and 111. There is very little evidence of this occurring in Scotland.

M. spicatum, *L.* The aggregate has been recorded from all *except* 104, 107.

M. spicatum, *L.*, *segr.* This is on record for vice-counties, *except* 79, 81, 82, 84, 91, 94, 95, 96, 104, 107, 112.

M. alterniflorum, *DC.* On record for all *except* 75 (?) 76, 77 (?), 79, 82.

Callitriche verna, *L.* The aggregate in all the vice-counties.

C. verna, *L.*, *segr.*, 72-74 ("Fl. Dumf."), 76 and 77 ("Gl. Cat."), 86, 91-96, 97 to 105 (all "Gl. Cat."), 106, 107, 108, 110. In the uncertainty of determinations in this critical group the sources for information have been specified.

C. stagnalis, *Scop.* All.

C. polymorpha, *Lönnr.*, has been recorded from Shetland (112), by Mr. Beeby.

C. hamulata, *Kuetz.* All *except* 76, 79, 80, 81, 82, 83, 84, 85.

C. autumnalis, *L.*, 95, 93, 100, 101. Sonntag records this for 82 and 83.

LYTHRACEÆ.

Peplis Portula, *L.*, 80.

Lythrum Salicaria, *L.*, 93 (near Ellon), 94 (by river Deveron below Huntly), probably escapes.

ONAGRACEÆ.

Epilobium angustifolium, *L.*, 76, 100. This has been and is often cultivated; and it often occurs as an outcast or escape, usually as var. *brachycarpum*, Leighton.

[*E. Dodonæi*, *Vill.*, reported by Syme (in "Eng. Bot." ed. 3, vol. iv. p. 7), under the name *E. rosmarinifolium*, Hæncke, as collected by J. Robertson in Glen Tilt and on banks of river Tay, is believed to rest on the erroneous determination of a small form of *E. angustifolium*.]

E. hirsutum, *L.*, 93. Moray ("Eng. Bot." ed. 3).

E. parviflorum, *Schreb.*, 84, 108.

E. roseum, *Schreb.*, 86.

E. tetragonum, *L.* The aggregate has been reported from all *except* 112.

E. adnatum, *Griesb.*, 72, 78 (Glen Falloch), 95, 97, 98. This has also been recorded from 73-74 ("Fl. Dumf."), 75-77 ("Gl. Cat."), 83, 86, 88, 100-102 ("Gl. Cat."), but these records require to be verified.

- E. obscurum*, *Schreb.*, 75, 76, 84, 93, 94, 95, 96, 102, 104.
E. palustre, *L.*, *var. lapponicum*, *Wahl. (p.p.)*, 98 (Kingshouse, *E. S. Marshall*, in "J. Bot." 1890, p. 6).
var. lavandulæfolium, *Lecour* and *Lamotte*, 88, 89, 92, 93, 94, 108, 109, 112.
var. lineare (*Krause*), 88, 96.
E. alsinefolium, *Vill.*, 112.
E. anagallidifolium, *Lam.* *Delete* (?) after 72.

Of the many hybrid *Epilobia* described, the following have been observed in Scotland :—

- E. alsinefolium* × *anagallidifolium* (*Boissieri*, *Hauskn.*), 89, 90, 92, 108.
alsinefolium × *montanum* (*salicifolium*, *Facchini*), 87 (Ben Cleuch).
alsinefolium × *obscurum* (*rivulicolum*, *Hauskn.*), 86, 87, 108.
alsinefolium × *palustre* (*Haynaldianum*, *Hauskn.*), 108.
E. anagallidifolium × *obscurum* (*Marshallianum*, *Hauskn.*), 86, 108.
anagallidifolium × *palustre* (*dasycarpum*, *Fr.*), 86, 105, 108, 110.
E. montanum × *obscurum*, 86, 87, 88, 92, 97, 105.
montanum × *palustre*, 96.
E. obscurum × *palustre* (*ligulatum*, *Baker*), 87, 88, 89, 90, 94, 95, 97, 98, 105, 108, 110, 111.
obscurum × *parviflorum*, 72, 86, 88, 90, 105.
E. palustre × *parviflorum*, 88.
E. nummularifolium, *A. Cunn.*, 83 (a weed in gardens, escape from cultivation).
Ænothera biennis, *L.*, 83 casual.
Circæa lutetiana, *L.*, 84, 103, 104 (confirmed), 107 requires confirmation.
C. alpina, *L.* The records for this are not to be relied on as distinct from *var. intermedia*, *Ehrh.*, to which latter a number of the published records of *C. alpina* in Scotland probably belong.
var. intermedia, *Ehrh.* Add 76, 77, 83, 91, 93, 94, 97, 98, 99, 100, 101, 102, 105.

LOASACEÆ.

Mentzelia albicaulis, *Dougl.*, 85 (casual at Burntisland, 1905).

UMBELLIFERÆ.

Eryngium maritimum, *L.* *Delete* 77; 76 requires confirmation.
Astrantia major, *L.*, 83†. Recorded in "Gl. Cat." from 75, 76, 77, 86, 102, 103.
Conium maculatum, *L.*, 104 ("Gl. Cat.).

Bupleurum croceum, Fenzl., 83; *B. protractum*, Hoffm. and Lk., and var. *heterophyllum*, Lk., both 83; *B. rotundifolium*, L., 83; all casuals.

Apium nodiflorum, *Reichb. fil.*, 81, 82, 83, 84, 103 105 (?), 98 ("Gl. Cat.).

var. *repens*, *Hook. f.*, 82, 83.

var. *ocreatum*, *Bab.*, 72 (?), 73 (?).

A. inundatum, *Reichb. fil.*, 84.

Cicuta virosa, *L.*, 86, 96, 105 (?); in "Gl. Cat." are also given 97, 98, and 101.

Carum verticillatum, *Koch.*, 77 ("Gl. Cat."), for 88 read 87 (Glen Falloch).

C. Petroselinum, Benth. and H. f., 75 and 77 ("Gl. Cat."), 83, 104. Rarely more than a casual.

C. Carui, *L.* Frequent near houses among herbage, as an escape or occasionally sown, 75 and 76 ("Gl. Cat."), 77, 83, 84, 90, 94, 95, 102, 109, 111.

Falcaria vulgaris, *Bernh.*, 83 casual.

Sium latifolium, *L.*, 74†, 75.

S. erectum, *Huds.*, 76 ("Gl. Cat."), 101.

Ægopodium Podagraria, *L.*, 105.

Myrrhis Odorata, *Scop.*, 106.

Chærophyllum temulum, *L.*, 101.

Scandix Pecten-Veneris, *L.*, 97†, 101, 102, 111 confirmed.

S. iberica, *Bieb.*, 83, 85.

Anthriscus vulgaris, *Bernh.*, 75†. In "Gl. Cat." are given "76 (?), 98, 99, 100 (?), 101, 102, 103 (?), 104, 105, 110 (?)" ; but I am not aware of other records of this plant from these vice-counties. Wherever I have seen it in Scotland its habitats suggest that it is not native.

A. Cerefolium, Hoffm. Only an introduction, and little more than a casual, 72; "frequent near Glasgow" (Hopkirk).

Foeniculum vulgare, *Mill.*, 93 casual. Dr. H. H. Johnston has recorded this ("Ann. Scot. Nat. Hist." 1895, p. 177) from 111 as follows: "Seashore, Carrick, Eday, 11th July 1883, native."

Œnanthe fistulosa, *L.*, 76, confirmed, 99.

Œ. Lachenalii, *C. Gmel.*, 105 (?).

Œ. crocata, *L.*, 84.

Æthusa Cynapium, *L.* A weed in gardens and cultivated ground, scarcely more than a colonist, 84, 98, and 101 ("Gl. Cat.).

Silaus flavescens, *Bernh.*, 102.

Meum Athamanticum, *L.*, 105 (?).

Ligusticum scoticum, *L.*, 105.

Archangelica officinalis, *L.*, 82 and 83, escape or casual.

Peucedanum Ostruthium, *Koch.* An old escape, now naturalised in many places, 77, 78, 83, 84, 85, 88, 92, 93, 94, 99.

P. palustre, Moench, 99.

P. sativum, Benth. and Hkr. *f.*, casual, as in 75, 83, 86, 87, 92, 93, 99, 100.

Coriandrum sativum, L., casual, as in 73, 83, 92.

Daucus Carota, L., 94.

D. gummifer, Lam., 83 casual.

D. littoralis, Sibth. and Sm., 83 casual.

Caucalis latifolia, L., casual, 83, 94.

C. nodosa, Scop., 73 casual, 102 (?).

C. daucoides, L., 83 casual.

C. leptophylla, L., 83 casual.

C. tenella, Del., 83 casual.

Ammi Visnaga, Lam., 83 casual; *A. majus*, L., 83 casual.

Bifora radians, Bieb., 83 casual; *B. testiculata*, 83 casual.

ARALIACEÆ.

Hedera Helix, L. All.

CORNACEÆ.

Cornus sanguinea, L., "Gl. Cat." adds 75, 76, 98, 99, 101.

Probably may be met with, as an introduced plant, in most of the southern and midland vice-counties.

CAPRIFOLIACEÆ.

Adoxa Moschatellina, L., 84, 97, 101.

Symphoricarpus racemosus, DC. Frequent, and in places almost naturalised, *e.g.* in 73 and 93.

Sambucus nigra, L. In all *except* 112; but I have never seen this where it was evidently native.

S. Ebulus, L., 86, 97, 98. Its habitats throw doubt on the claim of this to be regarded as native in Scotland.

S. racemosus, Willd. Becoming very plentiful among undergrowth of woods in various districts, and scattered freely by birds apparently, 83, 92, 93.

Viburnum Opulus, L., 84, 86, 93†.

Linnæa borealis, Gronov., 105 (?), 106.

Lonicera Periclymenum, L. In all.

L. Caprifolium, L. Semi-naturalised here and there, 83, 84, 88.

L. Xylosteum, L., 90.

RUBIACEÆ.

Galium boreale, L., 101.

G. Cruciata, Scop., 98 ("Gl. Cat.").

G. erectum, Huds., 74, 86, 92, 93, 101, 107. *Delete* 81.

? var. *diffusum* (Hooker), 83, 90. Found by G. Don, but probably as a casual.

var. *aristatum* (Sm.), 90 (G. Don).

- G. Mollugo*, *L.*, 74, 76† (?), 86, 93† (?), 97†, 99 ("Gl. Cat."), 106.
G. Mollugo × *verum* (*ochroleucum*, *Baker*), 92 (one locality), 106.
G. sylvestre, *Poll.*, 73, 92, 93, 94.
G. palustre, *L.*, *var. Witheringii* (*Sm.*), 86, 88, 91, 92, 93, 94, 95, 96, 98, 110; and in "Gl. Cat." for 75, 76, 77, 99-104.
G. uliginosum, *L.* Reported in old lists for 111 and 112, but not confirmed. 97 should be verified.
G. spurium, *L.*, casual in 92. Reported from near Forfar (90) by *G. Don*.
var. Vaillantii, *DC.*, casual on rubbish and in fields, 92, 93.
G. tricornis, *Stokes*, casual, 83, 92, 93, 94, 95.
G. saccharatum, *All.*, 89 and 90 casual (*G. Don*, not since).
Asperula odorata, *L.* Delete 111.
A. taurina, *L.*, casual or seminaturalised, 79, 83.
A. arvensis, *L.*, casual or seminaturalised, 76, 83, 93, 94, 95.
A. orientalis, *Boiss.* and *Hohen*, 83 (?).
Crucianella stylosa, *DC.* Rare outcast in Perthshire.
Sherardia arvensis, *L.* In all.

VALERIANACEÆ.

- Centranthus ruber*, *DC.* Escape or casual, 83, 85, 87, 88.
Valeriana dioica, *L.*, 109†.
V. Mikanii, *Syme*, 93, 97, 101. Given in "Gl. Cat." also for 75-77, 86, 98-100, 102-105.
V. sambucifolia, *Wild.* In all.
V. pyrenaica, *L.* Often seminaturalised, 77, 83, 84, 85, 91, 99.
 In "Gl. Cat." also for 75, 76, 98, 102.
V. coronata, *DC.*, 83 casual.
Valerianella olitoria, *Poll.*, 107. In "Gl. Cat." for 97, 101, 103-105.
var. lasiocarpa, *Reichb.*, 84.

DIPSACACEÆ.

- Dipsacus sylvestris*, *L.*, 77 confirmed; 82, 93, casual. A very doubtful native of Scotland.
D. Fullonum, *L.*, 83 casual.
Scabiosa arvensis, *L.*, 108, 109. Delete 103.
S. prolifera, *L.*, 83 casual.
Cephalaria syriaca, *Schrad.*, 83 casual.

COMPOSITÆ.

- Eupatorium cannabinum*, *L.*, 101.
Solidago Virgaurea, *L.* The *var. angustifolia* (*Gaud.*) has been recorded from several vice-counties, and is not uncommon.
var. cambrica (*Huds.*), 96, 105, 108, 109, 110.

- S. canadensis*, L. A not infrequent escape, 92, 94.
Aster Tripolium, L., 77, 86 requires confirmation.
A. paniculatus, Ait., *A. laevigatus*, Willd., *A. laevis*, L., *A. longifolius*, Lam., and other North American Asters may be found by streams, near houses, and elsewhere, as outcasts or escapes; but the determination of these casuals is difficult, and the records are apt to be not very trustworthy or useful.
Callistephus hortensis, Cass., 83 casual.
Erigeron canadense, L., casual, 83. Though widely naturalised elsewhere in Western Europe this does not seem able to establish itself in Scotland.
E. acre, L., 90, delete 88.
Antennaria dioica, Gærtn., var. *longipedicellata*, F.B.W., 92.
 var. *completa*, DC., "The Scottish Highlands."
 var. *hyperborea*, DC., 104.
Anaphalis margaritacea, Benth. and Hkr. f. Occasional outcast or casual, 79, 83.
Gnaphalium sylvaticum, L. In all.
G. norvegicum, Gunn., 105.
Inula Helenium, L., 103†, 77 ("Gl. Cat."). Ross(?) ("Top. Bot." ed. 2).
Pulicaria dysenterica, Gærtn., 75, 77 ("Gl. Cat.").
Ambrosia artemisiæfolia, L., casual on rubbish, 83, 92.
A. trifida, L., 83 casual.
Xanthium spinosum, L., casual in 83 and 86.
Coreopsis tinctoria, Nutt., 83 casual.
Helianthus annuus, L., 83; *H. argyrophyllus*, T. Gr., 92; *H. decapetalus*, L., 92; *H. tuberosus*, L., 83, 92, 95 all casuals.
Sanvitalia procumbens, L., 83 casual.
Bidens cernua, L., 84, 98.
B. tripartita, L., 92 casual.
B. chrysanthemoides, Michaux, 92 casual.
Cladanthus arabicus, Coss., 83 casual.
Achillea crithmifolia, W. K., 92 casual.
A. nobilis, L., 83 and 85, rare casual.
A. Santolina, L., 83 casual.
A. tomentosa, L., 76, 94, 99, as an escape.
Anthemis tinctoria, L., casual, 83, 85, 90, 107.
A. Cotula, L. So far as seen by me this is a casual or little more in Scotland. 76 ("Gl. Cat."), 92, 110.
A. arvensis, L., 93 casual, 94 casual.
A. altissima, L., 83 casual.
A. maritima, L., 83 casual.
Anacyclus radiatus, Loisel., 95 casual.
A. clavatus, Pers., 83 casual.
Chrysanthemum Myconis, L., 92 casual.

- C. Parthenium*, Pers. Well established in many places, but not native in Scotland, 98. Given in "Gl. Cat." for 75, 97, 101, 103, 104, 105.
- C. Balsamita*, L., 83 casual.
- C. macrophyllum*, Wald. and Kit., 83 casual.
- Matricaria inodora*, L. In all.
 var. salina, Bab., 110. Given in "Gl. Cat." for 97, 101, 102, 104.
 var. phæocephala, Rupr., 108, 109.
- M. maritima*, L., 107.
- M. Chamomilla*, L., 84.
- M. discoidea*, DC. Well established in several places on east coast, 83, 84, 90, 91, 93, 94.
- Tanacetum vulgare*, L., 84, 98, 103.
- Artemisia Absinthium*, L., 92 casual. Records for 105 and 112 much need confirmation.
- A. vulgaris*, L., 107.
 var. coarctata, Forcelles, 96, 108.
- A. Abrotanum*, L., 83 casual.
- A. campestris*, L., 83 casual, 86†.
- A. Absinthium*, L., 92 casual.
- A. maritima*, L., 85, 99 ("Gl. Cat.")
- A. arenaria*, DC., 92 casual.
- A. biennis*, Willd., 83 casual.
- A. scoparia*, Kit., 83 casual.
- Petasites fragrans*, Presl. Originally planted, but in some places almost naturalised, 83, 90, 109.
- P. officinalis*, Mœnch., 107, 109† (?).
- P. albus*, Gærtn. A well-established denizen in several districts, 76, 84, 90, 93, 95.
- Doronicum Pardalianches*, L. A denizen, so well-established as occasionally to appear native, 75, 76, 83, 85, 90, 102 ("Gl. Cat."), 105.
- D. plantagineum*, L., 84, 90, 94.
- Calendula arvensis*, L., 83 ; *C. officinalis*, L., 82, 83, 92, 93 ; casuals.
- Senecio sylvaticus*, L., 84, 105.
- S. viscosus*, L., 84, 97†, 98†.
- S. erucifolius*, L., 75, 85†.
- S. Jacobæa*, L., *var. flosculosus* (Jord.), 108.
- S. ægyptius*, L., 83 casual.
- S. saracenicus*, L., 76 and 77 ("Gl. Cat."), 83, 85, 98 ("Gl. Cat.).
- Arctium Lappa*, L., *aggr.* In all.
- A. majus*, Bernh., 75 ("Gl. Cat.).
- A. intermedium*, Lange, 80, 92 casual, 93 casual, 97, 100, 102 ("Gl. Cat."), 112.
 var. subtomentosum, 96, 106.

- A. Newbouldii*, *Ar. Benn.*, 99, 101, 107, 111.
A. minus, *Bernh.*, 84, 93, 94.
Carduus pycnocephalus, *L.*, 84, 95 confirmed; also reported in
 "Gl. Cat." for 97, 98, 99, 101, 102, 105.
C. nutans, *L.*, 92 casual, 105 (*Ewing*).
C. crispus, *L.*, 80, 93. In "Gl. Cat." for 100 and 105.
Cnicus eriophorus, *Roth.*, 86.
C. arvensis, *Hoffm.*, *var. mitis*, *Koch*, 105.
 var. horridus (*Adam*), 105.
 var. setosus (*Bess.*), 83†, 111.
C. rivularis, *Willd.*, 83 casual.
C. syriacus, *Roth.*, 83 casual.
Onopordon Acanthium, *L.*, 84 casual, 86.
Mariana lactea, *Hill*, 81, 83, 85, 90, 99.
Saussurea alpina, *DC.*, 86, 102 ("Gl. Cat."), 106.
Hemizonia Kelloggii, *Greene*, and *H. pungens*, *Torrey and Gray*, 83,
 casuals.
Carbenia argentata, *L. and C.*, *benedicta*, *Adans.*, 83, casuals.
Carthamus depressus, *M. Bieb.*, 83; *C. ibericus*, *Trev.*; *C. nicæensis*,
All., 83; and *C. tinctorius* *L.*, 83 and 92; all casuals.
Galactites tomentosa, *Moench.*, 83 casual.
Centaurea Scabiosa, *L.*, 99, also in "Gl. Cat." for 98 and 100.
 var. succisæfolia, *E. S. Marshall*, 108.
 var. coriacea, *Wald. and Kit.*, 85.
 var. angusiensis, *F. N. Williams*, 90.
C. nigra, *L.*, *f. radians*, 88.
 var. rivularis, *Brot.*, 88 and 90 (*F. N. Williams*).
C. Cyanus, *L.*, 108.
C. Calcitrapa, *L.*, 83 casual: *C. calcitrapoides*, *L.*, 83 casual; *C.*
Jacea, *L.*, 88 casual; *C. melitensis*, *L.*, 83 casual; *C. montana*,
L., casual in 83 and 86; *C. salmantica*, *L.*, 83; *C. solstitialis*,
L., 83 casual.
Scolymus maculatus, *L.*, 83 casual.
Cichorium Intybus, *L.* Scarcely more than a casual; 76, 86, 94,
 101.
C. divaricatum, *Willd.*, and *C. Endivia*, *L.*, 83, casuals.
Rhagadiolus edulis, *Gært.*, 83; *R. Hedyphnois*, *L.*, 92; and *var.*
tubæformis, *Ten.*, 83; *R. stellatus*, *Willd.*; all casuals.
Picris hieracioides, *L.*, 83 casual.
Crepis virens, *L.*, 110. Delete 111
C. biennis, *L.*, 80†, 85†.
C. alpina, *L.*, 83 casual.
C. setosa, *Hall. fil.*, "Scotland."

(To be continued.)

ZOOLOGICAL NOTES.

The Black Rat in Orkney.—The known information about the Black Rat (*Mus. rattus*, Linnæus, referred to more definitely by Millais in the "Zoologist," June 1905, as *Mus rattus rattus*) in Orkney, previous to 1848, is summarised by Baikie and Heddle in three lines—"The Black Rat, which was said formerly to have been numerous throughout Orkney, is now confined to a single island, *viz.* South Ronaldshay, and even there is quickly decreasing." Harvie-Brown and Buckley, in 1891, write that it is still stated to occur on the same island, but that they have not had an opportunity of verifying the statement. In the "Annals" 1900, p. 181, Mr. J. M. B. Taylor mentions a South Ronaldshay specimen just added to the Paisley Museum. We are able to say that this specimen and another which was too far gone for preservation were sent from the farm of Burwick. In August 1905 Mr. H. Drummond Simpson and I, during a visit to South Ronaldshay, made careful enquiries about this animal—locally known as the Blue Rat—and we ascertained that it still holds its own on the island. We heard of its occurrence at St. Margaret's Hope, and at the farms of Brough and Burwick in the south of the island. Mr. Budge, Brough, told us that one was seen near his farm at the time of our visit, and Mr. Allan, Burwick, informed us that the Blue Rat was at one time a pest on his farm, but was driven off by the introduction of concrete flooring. Our informants agreed that in summer this species lives mainly by the shore. Mr. Allan took us to a cave at Burwick Castle, an old Brough, where he had once found a nest of young Blue Rats, and we left a rat-trap there for a night, but unavailingly. Our efforts to secure a specimen failed, but we left a rat-trap with Mr. Allan, who kindly agreed to capture specimens for us on their return to his farm in winter. A pair came to the farm at the beginning of November; the male was trapped on 13th November, and the female on 19th November. The measurements of the male, taken by Mr. Eagle Clarke and myself, were: head and body 179 mm., tail 204 mm., hind foot without claws 34.5 mm., ear 24 mm. The weight was 149.5 grammes. The corresponding measurements of the female, taken by myself, were: head and body 156 mm., tail 196 mm., hind foot 35 mm., ear 23 mm. It may be worth while putting these occurrences on record, in view of the opening of a pier at St. Margaret's Hope in the near future. We also ascertained that the Blue Rat occurs on the Calf of Flotta, our informant stating that he had seen two held prisoners by their feet by limpets which they had probably been endeavouring to get at to devour.—ROBERT GODFREY, Edinburgh.

The Food of the Bank Vole.—It is not often that one has an opportunity of ascertaining what constitutes the food of some of our

smaller mammals in a state of nature, and this leads me to place on record the following little experience. On 28th October, Mr. Laidlaw and I were walking on the main road a little to the north of Pitlochry when we saw a small rodent seize a hip of the wild rose and dart into a wall. It almost immediately came to the mouth of the hole and commenced feeding on the fruit, and we at once saw that the animal was a Bank Vole (*Evotomys glareolus*).—WM. EAGLE CLARKE.

Brambling in Tiree.—On the 1st of March last I shot a male Brambling, the first I have ever seen here, in my garden. I sent the bird to Mr. Harvie-Brown.—PETER ANDERSON, Tiree.

Goldfinches in Midlothian.—The occurrence of the Goldfinch (*Carduelis carduelis*) in Midlothian is now so rare that any instance of it is worth recording. On Thursday, 9th November, Mr. Hugh Campbell, Dalmeny Park, saw two near Arniston Gates, Gorebridge. Near the same place Siskins (*Chrysomitris spinus*) were in abundance, and at another part of the road nearer Rosebery a small party of Bullfinches (*Pyrrhula europæa*) were seen.—CHAS. CAMPBELL, Cramond Brig.

Tree-Sparrow in West Lothian.—At intervals during the late autumn I had heard the call-notes of some Sparrows in a small wood here, which attracted my attention, but I found the birds remarkably shy, and at first I failed to obtain a satisfactory view of them, and it was not until 1st December that I at length was able to make certain of their identity. I have only seen about half-a-dozen, though there are probably more. They are frequenting this wood most regularly, being in it or the immediate vicinity at all times of the day.—SYDNEY E. BROCK, Kirkliston.

Tree-Sparrow in Fife.—During the month of September, along with my friend Mr. Robert B. Whyte, I found the Tree-Sparrow common in the vicinity of Crail. A flock of forty or so was constantly feeding about a refuse heap near the churchyard; the species was also observed inland from Crail on the St. Andrews road, and at Craighead farm, where it was associating with the House-Sparrow. The numbers and distribution indicate that the Tree-Sparrow is a resident in the East Neuk, as well as at the old-established and better known stations, Leuchars and Lindores, further north.—GEORGE B. BARBOUR, Edinburgh.

Occurrence of the Bullfinch in Shetland.—There has been a considerable immigration of Bullfinches here, and doubtless elsewhere in Shetland. On the afternoon of 21st November when opening my garden gate I got a glimpse of a gaily plumaged bird among the shrubs, and on examining it closely with a glass I was surprised to find it was a cock Bullfinch, and close by it a hen bird.

Later my sister, without my mentioning what I had seen, told me she had seen the male. The following day I failed to see the birds, but on the 23rd in the same place I again saw a cock and two hens, on the 24th a cock and hen, on the 25th five hens, on the 26th a cock and three hens, and on the 28th a cock and hen. From that date till 3rd December I saw none, but on that day I again saw a cock and hen, on the 6th three hens, and on the 13th and 16th a hen.

This visit has not been confined to the main island, for a cock was seen in the manse garden on the remote Island of Foula early in November, and on the 3rd of that month one was obtained on Fetlar.—JOHN S. TULLOCH.

[There can be little doubt that the birds belong to the large northern European race known as *Pyrrhula major*, and we hope through Mr. Tulloch's kindness to be able to examine a specimen.—EDS.]

Late Breeding of the Corn Bunting.—On the 20th of September while following a self-binder in a field of oats, I found a nest of the Corn Bunting (*Emberiza miliaria*) containing four fresh eggs. This is surely a late date.—ROBERT B. BELL, Stronsay, Orkney.

Blackcap in West Ross-shire.—It may interest you to record that my brother (Sir John Fowler) shot a male Blackcap Warbler (*Sylvia atricapilla*) in the garden here on 23rd November. It was in the garden for some days previous, with what we suppose was the female, as it was the same size and colour as the male bird, but with a brown cap to its head instead of a black one.

This supposed female was attacked by the male bird and had its eye almost destroyed, and we have not seen it since. We have never before seen or heard of a Blackcap in these parts, and we are having it set up for the collection at Braemore.—MARJORIE FOWLER.

[In the recently published volume on the Fauna of the North-West Highlands this species was placed within brackets, indicating that its occurrence in the area required confirmation. We are now glad to have its claims established so satisfactorily.—EDS.]

Black Redstart in Orkney.—On the 19th of November an adult male Black Redstart (*Ruticilla titys*) in splendid plumage was picked up dead on the island of Shapensha. Since Baikie and Heddle's time, I know of only one other instance which may be relied upon—that is of a young male shot in a Kirkwall garden by the late Mr. B. Rankin on the 15th of December 1859.—WM. COWAN, Kirkwall.

[Several Black Redstarts have also visited the Flannan Isles during the past autumn, and an example has been received by us for identification.—EDS.]

Occurrence of Marsh-Titmouse in Argyll.—On the 29th November last a Marsh-Tit (*P. palustris*) appeared with the other birds which are fed here daily, and has since remained. It is

apparently a bird of the year, as it wants the black chin-spot. This is the first time that I have met with this species in Argyll, although I have been looking for it for years, and it would be interesting to hear whether any others have been noticed in this area.—CHAS. H. ALSTON, Letterawe, Loch Awe.

Hoopoe in Argyllshire.—I recently heard from a friend that a bird which he thought to be a Hoopoe (*Upupa epops*) had frequented the woods at Onich since early in October. His identification has been confirmed by a letter to the "Oban Times" of 11th November, wherein it is stated that a Hoopoe had been shot at Onich at the end of October or beginning of November. This bird is evidently a rare visitor to Argyll, for it has no place in the Fauna of the area published in 1892.—CHARLES CAMPBELL, Cramond Brig.

Wrynecks (*Lynx torquilla*) in "Forth."—During the autumn migration of 1905, a considerable number of Wrynecks appeared in the east of "Forth." On 7th September, having been informed by Mr. D. Bruce of their presence about Dunbar, I visited the locality and picked up a dead one on the railway bank east of the town, and had given to me another which had been killed by a passing train, a mile to the west of the station, on 4th September. On the 8th one was shot close to Dunbar, and on the 9th I got a glimpse of another as it flew away from an ant-hill upon the approach of an express. The birds, to the number of five or six at least, had been observed from about the 25th of August. I also examined a specimen that had been found in a dying state at Elie on or about 30th August. One from Shetland came under my notice a few days later.—WILLIAM EVANS, Edinburgh.

Speed of Flight in the Heron.—Sir Herbert Maxwell has the following interesting note on this subject in a recent number of the "Scottish Review":—"If one were asked to name a British bird of slow flight and sluggish wing-beat, very likely he would name the Heron. Deliberate as the movement appears to the eye, the strokes amount to not less than 120 to 130 per minute. As to velocity, the Heron's speed is moderate, but far greater than might be imagined. One morning lately I started before sunrise in a motor to catch a main-line train at a station twenty miles distant. The air was perfectly still, my road lay level close along the shore, and not a human being was stirring on it. As we crossed a bridge over a little burn, a Heron rose in the dusk, much agitated, and flew out to sea. After holding its course for half a mile or so, the bird turned to the right, and flew parallel with the road and my car. Presently a bend in the shore brought the Heron immediately in front of me, at a distance of about one hundred yards. We were running about up to speed limit—twenty miles an hour—yet the Heron held easily ahead of us, and finally flew out of sight behind a hill. Now I am convinced that most

people, viewing this bird's apparently leisurely flight, would have estimated its velocity at less than half the actual speed."

Breeding of the Pintail Duck in Shetland.—It has for some time past been suspected that the Pintail Duck (*Dafila acuta*) has bred in Dunrossness, Shetland, but the fact remained not proven until the past summer. On the 4th of June I saw a pair. The young birds were then hatched. There were six of them, and the female was very restless and excited when the young were approached, and would come within a few yards, quacking loudly; but the male kept at a respectful distance. One of the birds is here now (17th November), and may often be seen winging round the house in the early morning in company with the tame Mallards.—THOMAS HENDERSON, Jun., Dunrossness.

Goosander and Scoter in Outer Hebrides.—I saw two Goosanders (*Mergus merganser*), a male and a female, in the Sound of Lingay off the north end of North Uist on 31st October 1905. Mr. Harvie-Brown's book seems to leave it doubtful whether these birds visit the Outer Hebrides, and I have been on the look-out for them for the last nineteen years, but never before saw a single specimen in the Outer Isles. There can be no doubt about this pair, as they passed over my head within twelve yards, and immediately afterwards over Sir Arthur Campbell-Orde. Both of us identified them without hesitation, and either of us might have shot them had we not been afraid we might spoil a chance at Brent.

On 6th November we saw two Black Scoters (*Edemia nigra*) in the Sound of Lingay, and other two, apparently male and female, as the one was glossy black and the other sooty brown, in the Sound of Harris.—ANDREW ELFRISH, Lochmaddy.

Weights of Woodcock and Snipe in Shetland.—It is well known to residents in Shetland that Woodcock and Snipe obtained there are exceptionally heavy. The following weights may interest some of your readers:—

Nov. 1902, average weight of 30 woodcock, 13.20 oz.					
Dec. "	"	31	"	13.74	"
Jan. 1903	"	35	"	13.28	"
Feb. "	"	12	"	12.50	"
Nov. "	"	12	"	13.75	"
Dec. "	"	21	"	13.66	"
Jan. 1904	"	13	"	14.01	"
Nov. "	"	18	"	12.33	"
Dec. "	"	7	"	13.28	"
Jan. 1905	"	13	"	13.30	"

I give rather more particulars about these Woodcock than is perhaps necessary, but the average weights seem worth recording. Three days of frost or snow will bring Woodcock down in condition considerably, but if the winter is open they increase in weight up to,

or even beyond, the new year. I have killed Woodcock up to 17 oz., a few of 16 oz., but birds of from 15 to 15½ are plentiful in the month of December. I have the weights of ninety Snipe which average 5.78 oz. Mr. Howard Saunders in his "Manual of British Birds" gives the average weight as 4 oz., which is much under the above. I have killed Snipe up to 7 oz., and remember one day getting three of 7.7 and 6 oz. I have been told of birds of 8 oz. Jack Snipe often weigh 3½ oz., but the average is 3 oz., against 2 oz. given by Mr. Saunders in his manual. The probable reason why these birds weigh more in Shetland is the open winters; perhaps the undrained state of the country may also have something to do with it.—R. C. HALDANE, Lochend, Shetland.

Great Snipe in Orkney.—On 12th September I shot a Great Snipe (*Gallinago major*) here and saw another the same day. In both cases the birds rose from rough grass near a loch and marsh, and their flight was heavy and sluggish. Ruff (*Machetes pugnax*) are very numerous here at present (25th September).—ROBERT B. BELL, Stronsay, Orkney.

A Great Crested Grebe on Duddingston Loch, Edinburgh.—On the afternoon of Sunday, 3rd December, we observed on Duddingston Loch a bird which on closer examination proved to be a Great Crested Grebe (*Podiceps cristatus*).

We were told that the bird had appeared on the previous day accompanied by another bird, which had been shot at and wounded by some one, but escaped. We conjecture that this bird was the mate of the one we noticed.—W. T. BLACKWOOD, G. G. BLACKWOOD, Edinburgh.

Red Mullet (*Mullus barbatus*) in the Solway.—This fish seems not to have been captured, or at least identified, in our local waters hitherto. However, early in August Sergeant Murdoch, the keeper of Southernness Lighthouse, informs me he captured several fine specimens in his paidle net placed on Southernness Point. They were identified by a gentleman visitor to the village, who was acquainted with the species.—ROBERT SERVICE, Maxwelltown, Dumfries.

Maigre (*Sciæna aquila*) in the Solway.—The capture of this fine fish in the nets at Portling on the 11th July is of interest to naturalists, as it adds another species to the list for the Galloway and Dumfriesshire waters, and is at the same time an addition to the species that have been found in Western Scottish waters. I had the great pleasure of seeing the specimen on the day following its capture. It was a large, handsome fish, five feet in length, and 33 inches girth at the first dorsal. Rather thin for its size, it was about 70 lbs. in weight. Large lustrous eyes were conspicuous, and fine

large scales, many of them the size of half-a-crown, and of a glistening silvery white, attracted attention at once.—ROBERT SERVICE, Maxwelltown, Dumfries.

Land Shells at Balelone, N. Uist, Outer Hebrides.—The following species were noted in the above locality during the last days of May and the first week of June 1905:—*Hyalinia alliana*, *Vitrina pellucida*, *Helix aspersa*, *H. itala*, *H. acuta*, *H. pulchella*, *H. pygmæa*, *Clausilia bidentata*, *Pupa cylindræa*, *Cochlicopa lubrica* and var. *lubricoides*, *Succinea putris*, *Limnæa peregra*, *L. truncatula*, *Pisidium pusillum*.

In the garden all the British representatives of the genus *Arion*, viz. *ater*, *intermedius*, *circumscriptus*, *hortensis*, and *subfuscus* (1) occurred, while *Limax arborum* and *Agriolimax agrestis* were abundant. [*Agriolimax lævis* was taken I believe in Scolpais marsh but the note has gone amissing.] Some of the above were forwarded to Mr. Taylor, who remarks *re H. acuta*:—"The specimens embrace the var. *coalilis*, a by no means common form, also specimens (though not perfectly characteristic) of var. *strigalis* and *articulatis*. The *P. cylindræa* are interesting, being the edentulous form, and like the St. Kilda specimens recalling the Alpine form *sempronii*."—JAMES WATERSON, Edinburgh.

Land Shells in Orkney.—Among land and fresh-water shells collected in Orkney in August 1905 the following species—specimens of which I have submitted to Mr. Taylor—may be mentioned:—

Hyalinia fulva, two at the School Loch, South Ronaldshay.

Helix pygmæa, one at the Black Craig of Stromness.

Balea perversa, common in Burwick Churchyard, South Ronaldshay.

Carychium minimum, three at the Looms, Stromness.

Planorbis nautilus (already recorded from Orkney) in School Loch, and in Graemston Loch, both in South Ronaldshay.

Pisidium pusillum in South Ronaldshay lochs. Mr. Taylor refers the specimens to *obtusalis*.

The species of slugs met with were *Arion ater*, *A. subfuscus*, *A. hortensis*, *A. circumscriptus*, *Limax maximus*, *L. marginatus*, *Agriolimax agrestis*, and *Ag. lævis*; all of these occurred in the immediate neighbourhood of Stromness.—ROBERT GODFREY, Edinburgh.

Arachnida from the Orkneys.—A small collection of *Araneidea* and *Phalangidea* kindly made for me in the Orkneys by Mr. Robert Godfrey of 46 Cumberland Street, Edinburgh, contained fourteen species of the former and six species of the latter. One of the *Araneidea* (true spiders), *Tmeticus reprobus*, Cambs., is rare and local, but widely distributed; the rest are of mostly abundant and well-known species. The *Phalangæus* (Harvestman) are also

common and widely dispersed, excepting *Oligolophus alpinus*, Herbst., which is a northern form. Although so few in number it has been thought worth while to record these few Arachnids as a small contribution to our knowledge of this group in those far-off regions, while it cannot be doubted but that they are a very meagre representation of what that locality contains.

ARACHNIDA.

ARANEIDEA.

Amaurobius fenestralis, Stroem.—Several examples, but all immature.
Tegenaria Derhamii, Scop.—One immature female.
Textrix denticulata, Oliv.—Several, adult and immature, all females.
Bolyphantes luteolus, Blackw.—Females, adult and immature.
Leptyphantes Blackwallii, Kulcz.—Adult and immature females.
Leptyphantes tenuis, Blackw.—Both sexes immature.
Bathyphantes variegatus, Blackw.—Several adult females.
Tmeticus bicolor, Blackw.—Immature examples of both sexes.
Tmeticus reprobus, Cambr.—An adult male and several females.
Gnidia (Dicyphus) bituberculata, Ard.—Adult females.
Meta merianæ, Scop.—An immature female.
Xysticus cristatus, Clk.—Immature females.
Pirata piraticus, Clk.—An immature female.
Lycosa pullata, Clk.—Females, adult and immature.

PHALANGIDEA.

Phalangium opitio, Linn.
Oligolophus morio, Fabr.
alpinus, Herbst.
tridens, C. L. Koch.
ephippiatus, C. L. Koch.
Nemastoma lugubre, O. F. Müll.

O. PICKARD-CAMBRIDGE, Bloxworth, Dorset.

Ptinus tectus, *Boield.*, in Scotland.—On 28th October last I found this beetle plentifully in a meal mill at Dunfermline, and submitted specimens to Prof. Hudson Beare, who visited the mill a month later and also found the insect in abundance. *Pt. tectus* is apparently quite a recent introduction into this country—see note by Prof. Beare in "Ent. Mo. Mag.," 1904, p. 4.—WILLIAM EVANS, Edinburgh.

Trichoptera new to Scotland.—The following local and interesting Caddis-flies have recently been captured by me in South-east Scotland, and have been identified by Mr. K. J. Morton :—

Halesus guttatipennis, M.L. — Cobbinshaw Reservoir, Midlothian, over a dozen (♂♂) captured, and at least a score more seen, 8th November 1905; were taking short flights in the sunshine.

Air cold. I felt I had got something good, probably *H. guttati-pennis*, and so they proved to be.

Limnophilus hirsutus (Pict.).—Luffness Marsh, East Lothian, 22nd July 1905, one specimen.

Rhyacophila munda, M.L.—♂, Cowie's Linn, a few miles north of Eddleston, Peeblesshire, 24th September 1904.—WILLIAM EVANS, Edinburgh.

Chiridium museorum (Leach) in Fife.—On 28th October last, when looking for beetles, etc., in an old-established meal mill at Dumfermline, I found this little pseudo-scorpion in plenty on the undersides of pieces of wood lying in dark out-of-the-way corners seldom visited by the brush. The creature is doubtless common in similar situations in many other parts of this district.—WILLIAM EVANS, Edinburgh.

Læmargus muricatus, Kröy., on a Sunfish captured in the Firth of Forth.—From a large Sunfish *Orthogoriscus mola*, which was captured at North Berwick on 28th September last, I took four specimens (♀ ♀) of this parasitic copepod. They were half buried in the fish's skin immediately behind the anal fin. Along with them were some much smaller parasites, which Dr. T. Scott tells me are *Caligus rapax*, M.-Edw. Notwithstanding its prior use by Kröyer, *Læmargus* has been adopted as the generic name of the Greenland Shark.—WILLIAM EVANS, Edinburgh.

Fauna of the Upper Elf Loch.—Referring to my paper in the "Annals" for October last, the tiny Oligochaet, *Æolosoma hemprichi*, Ehr. (= *chrenbergi*, Örst.), has since been detected in this pond; also, some further Bdelloids, etc., have been noted by Mr. J. Murray among material sent to him. I ought to have mentioned in my paper that Messrs. Scott and Lindsay's investigations were not undertaken with the object of producing an exhaustive list of the animals inhabiting the loch. The micro-fauna was their chief concern, other forms receiving little more than casual attention.—WILLIAM EVANS, Edinburgh.

BOTANICAL NOTES AND NEWS.

William Phillips, F.L.S., died on 22nd October 1905, at the age of eighty-three. A brief notice of his life and a portrait are given in the "Journal of Botany" for December last (pp. 361-362). Though a native of Wales, he spent his life, except the first ten years, in Shrewsbury, where he carried on business. His interest in botany showed itself comparatively late in life, under the influence of the Rev. W. Leighton. It began with flowering plants, but

extended to algæ and fungi, ultimately being centred in the Discomycetes, on which in 1887 he published a "Manual of British Discomycetes." This at once took rank as the leading authority on the subject, and has earned him the gratitude of students of these fungi. He took part in one or two of the meetings of the Scottish Cryptogamic Society, and won the regard and esteem of those who had the pleasure of meeting him, and who benefited by his ready assistance in the study of the fungi of Scotland. In recent years he had chiefly turned his attention to the past history and antiquities of Shropshire.

A Census Catalogue of British Hepatics, compiled by Symers M. Macvicar, has just been issued by the Moss Exchange Club, and can be procured for 9d. from Mr. W. Ingham, 52 Haxby Road, York. It will be gladly welcomed by students of the group.

Some Perthshire Plants.—*Radiola linoides*, Roth.—In Dr. White's "Flora of Perthshire," this plant is not mentioned as having been observed in his district of "Breadalbane." It grew in considerable quantity in August of 1904 and 1905 on a by-road on Kiltyrie Farm, on Loch Tay, about five miles east of Killin, in the centre of the above-named district.

Trifolium agrarium, L., grew plentifully in a field on the farm of Edramucky, on Loch Tay, four miles from Killin, its seed having evidently been introduced as an impurity (or adulterant) in foreign clover seed.

Callitriche hamulata, Kütz., var. *homiophylla*, Gren. and Godr., occurs plentifully in Loch Tay, at the mouth of the Alt a Mhoirneas, four miles from Killin. This form of *C. hamulata* is described by Grenier and Godron as having "feuilles toutes linéaires," and is *C. angustifolia*, Hoppe, and *C. autumnalis*, Godm.

I am indebted to Mr. Arthur Bennett for the name and synonyms of this plant.—JAMES FRASER, Leith.

Scottish Hieracia.—In July last I collected a few hawkweeds which are either new to Scotland or new county records.

Hieracium sagittatum, Lindeb., var. *subhirtum* (F. J. Hanb.), W. R. Linton, in "Brit. Hieracia," p. 52; Glen Dole, Forfar, new to 92.

H. sciaphilum, Uechtr., var. *strumosum*, Ley, *l.c.* p. 68, Melrose, Roxburgh. New to Scotland, only recorded from Wales in "Brit. Hieracia."

H. ochroleucum, Stenstr., *l.c.* p. 64, Melrose, Roxburgh. New to Scotland. Recorded previously from Carnarvonshire, and doubtfully from Westmoreland.

H. petrocharis, Linton, Glen Fiagh, Forfar. Not given for that county in "Brit. Hieracia."

The Rev. W. R. Linton kindly named the specimens.—G. CLARIDGE DRUCE.

Scottish Carexes.—The Pfarrer Kükenthal has kindly examined a few critical sedges which I gathered in Scotland last July. One of them is a previously undescribed British form—*Carex Goodenowii*, Gay, var. *stenocarpa*, Kükenthal. This I found in marshes at the head of Loch Tummel, Mid Perth; by the Tay, near Perth; in Glen Fiagh, Forfar; and by the Tweed near Melrose, Roxburgh. I have it also from Thurso, Caithness; Lawers, Perth; Boat of Garten, Easternness; and Kinlochewe, West Ross. A curious plant from the Tummel swamps Kükenthal says is *C. Goodenowii*, f. ad *tomatam*, Fr. vergens.

Var. *chlorostachya* (Reichb.), Druce, "Fl. Berks," p. 542, Strath Tummel, Lawers, Mid Perth; Boat of Garten, Easternness; Kinlochewe, West Ross; Loch Durran, Caithness; Dingwall, East Ross; Mallaig, Westernness, etc. Var. *recta*, Kükenthal, Methuen Bog, Mid Perth. Kükenthal thought that this might possibly have been crossed with *C. rigida*. I thought it showed evidences of *C. aquatilis*, it is away from the range of *rigida*.

C. panicea, var. *tumidula*, Læst., Strath Tummel, Mid Perth; Corrie Li, East Ross, etc.

C. flava × *Æderi*, Glen Fiagh and Glen Dole, Forfar.

C. Æderi, Retz., Loch Tummel, Mid Perth.

C. lepidocarpa, Tausch, Glen Dole, Forfar.

C. rostrata, Stokes, var. *robusta*, Sonder; marsh near Loch Tummel, Mid Perth.—G. CLARIDGE DRUCE.

CURRENT LITERATURE.

The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—October-December 1905.

[The Editors desire assistance to enable them to make this Section as complete as possible. Contributions on the lines indicated will be most acceptable and will bear the initials of the Contributor. The Editors will have access to the sources of information undermentioned.]

ZOOLOGY.

THE LAND MAMMALS OF THE CLYDE FAUNAL AREA. Hugh Boyd Watt. *Trans. Nat. Hist. Soc. Glasgow*, vol. vii. (N.S.), part ii. (1903-1904), pp. 170-189 (published November 1905).—Notes on some forty-four species, recent and extinct.

RARE BIRDS IN ABERDEENSHIRE. George Sim. *Zoologist*, December 1905, p. 466.—This note refers to a Great Snipe shot near the mouth of the River Ythan, 5th September; a Roller shot at Auchmeden, near Aberdour, 9th September; and a Black-tailed Godwit obtained at the Ythan estuary, 12th September.

THE SYLVIIDÆ OF SOLWAY. Robert Service, M.B.O.U. *Trans. Nat. Hist. Soc. Glasgow*, vol. vii. (N.S.), part ii. (1903-1904), pp. 137-147 (published November 1905).—Notes on the Whitethroat, Garden Warbler, Lesser Whitethroat, Blackcap, Wood Warbler, Chiff Chaff, Sedge Warbler, and Grasshopper Warbler, all of which are recorded from the area in question.

HOOPOE IN INVERNESS-SHIRE. V. T. H. *The Field*, 11th November 1905, p. 864. Specimen shot by a crofter near Ballachulish Bay.

LATE STAY OF SWIFT. A. H. Meiklejohn. *Zoologist*, October 1905, p. 388.—One observed at St. Andrews on 17th September.

GADWALL IN KIRKCUDBRIGHTSHIRE. G. H. Robson. *The Field*, 4th November 1905, p. 818.—Three examples seen on 17th October, one of them (a male) being shot.

SANDWICH TERN (*STERNA CANTIACA*) IN THE FIRTH OF FORTH IN NOVEMBER. H. Drummond Simpson. *Zoologist*, December 1905, p. 465.—One seen at Dalmeny on 4th November.

THE ODONATA (DRAGON-FLIES) OF THE FORTH AREA. W. Evans. *Proc. Roy. Phys. Soc. Edin.*, vol. xvi. No. 3 (1905), pp. 87-96.—Records eleven species, with localities, etc.

LEPIDOPTERA IN SCOTLAND. C. T. Cruttwell. *Ent. Mo. Mag.*, November 1905, pp. 258-260.—A long list of species taken at Aviemore, Rothiemurchus, Rannoch, and the north coast.

SIREX JUVENCUS IN EDINBURGH. F. W. F. *Entomologist*, November 1905, p. 283.—Female specimen captured on 3rd October.

THE DIPTERA OF CLYDE, ETC., ETC. Robert Henderson. *Trans. Nat. Hist. Soc. Glasgow*, vol. vii. (N.S.), part ii. (1903-1904), pp. 148-154 (published November 1905).—This paper, as its long title explains, is "A List of Species of the Families *Platypezidæ*, *Pipunculidæ*, *Syrphidæ*, and *Conopidæ*, not recorded in Mr. P. H. Grimshaw's List (*Fauna and Flora, etc., of Clyde*, 1901), and of additional localities for most of the uncommon species there recorded." Forty-two additional species are mentioned.

LIST OF BRITISH DOLICHOPODIDÆ, WITH TABLES AND NOTES. G. H. Verrall, F.E.S. *Ent. Mo. Mag.*, November 1905, pp. 247-252.—In this, the concluding portion of an exceedingly valuable paper, many Scottish records are given, as in the previous instalments.

ON TWO SPECIES OF DOLICHOPODIDÆ TAKEN IN SCOTLAND. G. H. Verrall, F.E.S. *Ent. Mo. Mag.*, December 1905, p. 279.—This short article refers to *Dolichopus argyrotarsis*, Wahlb., and *Porphyrops gravipes*, Wlk., taken by Col. Yerbury at Nairn and Nethy Bridge in May and June.

ON THE BRITISH SPECIES OF HYDROTÆA, DSV. Percy H. Grimshaw, F.E.S. *Ent. Mo. Mag.*, October and November 1905, pp. 239-247.—Several Scottish localities mentioned for the various species.

NEW AND RARE BRITISH ARACHNIDA. Rev. O. P. Cambridge. *Proc. Dorset Nat. Hist. and Antiq. Field-Club*, vol. xxvi. (1905), pp. 40-74, 2 pls.—Contains several Scottish records, including two species new to science, namely, *Trochosa postuma*, found many years ago at Balmoral by the late Col. Pickard, and *Cnephalocotes ambiguus*, taken in Arran (not Bute as stated) by W. Evans in April 1895.

ON SOME NEW AND RARE CRUSTACEA FROM THE SCOTTISH SEAS. Thomas Scott, LL.D., F.L.S., etc. *23rd Ann. Rep. Fishery Board for Scotland*, part iii. (published 14th August 1905), pp. 141-153, pls. x.-xiii.—Describes fourteen species and varieties, of which eight are new to science and two new to Scotland.

NOTES ON BRITISH COPEPODA: CHANGE OF NAMES. Thomas Scott, LL.D., F.L.S., *Ann. and Mag. Nat. Hist.*, November 1905, pp. 567-571.—A new genus (*Beatricella*) erected, of which *B. mimica* is the type. This is recorded from the Firths of Forth and Clyde and the Moray Firth. *Delavalia normani*, sp. nov., is described from specimens obtained at Hunterston, Firth of Clyde.

OBSERVATIONS ON SOME PARASITES OF FISHES NEW OR RARE IN SCOTTISH WATERS. Thomas Scott, LL.D., F.L.S., etc. *23rd Ann. Rep. Fishery Board for Scotland*, part iii. (published 14th August 1905), pp. 108-119, pls. v. and vi.—This paper deals with twelve species of Copepoda and five of Trematoda, one of the former group being new to science.

BOTANY.

OBITUARY NOTICE OF THE LATE DR. ANDREW PEEBLES AITKEN, D.Sc. By William B. Boyd. *Trans. Edin. Bot. Soc.*, xxiii. pp. 47-53.

HERBARIA AND BIOLOGY. By Prof. J. W. H. Trail. *Trans. Edin. Bot. Soc.*, xxiii. pp. 69-81.

SUPPLEMENT TO "TOPOGRAPHICAL BOTANY." Edited by Arthur Bennett. This valuable supplement, which has been issued as a separately-paged supplement to the *Journal of Botany*, was completed in November. It extends to 118 pages.

SCOTTISH ALPINE BOTANICAL CLUB MEETING, 1894. By Alexander Cowan. *Trans. Edin. Bot. Soc.*, xxiii. pp. 53-56.—At Cannich in Glenaffric.

MOSESSES AND HEPATICS COLLECTED DURING EXCURSION OF S. A. BOT. CLUB IN 1904. By L. J. Cocks. *L.c.* pp. 61, 62.

THE ALPINE FLORA AND RARER PLANTS OF THE GLENSHEE DISTRICT. By William Young. *Trans. Edin. Bot. Soc.*, xxiii. pp. 83-91.

THE HEPATICÆ OF THE GLENSHEE DISTRICT. By William Young. *Trans. Edin. Bot. Soc.*, xxiii. pp. 93-98.

SOME RARE CAITHNESS PLANTS, WITH NOTES. By J. Greg Nicolson. *Trans. Edin. Bot. Soc.*, xxiii. pp. 41-45.

MEASUREMENTS OF THE GREAT BEECH TREE AT NEWBATTLE ABBEY, MIDLOTHIAN, 25TH AUGUST 1903. By John Ramsay. *Hist. Berw. Nat. Club*, xix. p. 80.

NOTE ON ARENARIA TENUIFOLIA, LINN., AS A SCOTTISH PLANT. By W. W. Smith, M.A. *Trans. Edin. Bot. Soc.* xxiii. pp. 113-114.

FRESHWATER ALGÆ FROM THE ORKNEYS AND SHETLANDS. By W. West, F.L.S., and Professor G. S. West, M.A., F.L.S. *Trans. Edin. Bot. Soc.*, xxiii. pp. 3-41, pls. 1, 2.—A very valuable paper, with descriptions and figures of new species.

A COMPARATIVE STUDY OF THE DOMINANT PHANEROGAMIC AND HIGHER CRYTOGAMIC FLORA OF AQUATIC HABIT, IN THREE LAKE AREAS IN SCOTLAND. By George West. *Proc. Roy. Soc. Edin.*, 1904-5, vol. xxv. pp. 967-1023, 55 plates of photographs. A very important contribution to Scottish Botany.

BOOK NOTICES.

THE EGGS OF THE BIRDS OF EUROPE, INCLUDING ALL THE SPECIES INHABITING THE WESTERN PALÆARCTIC REGION. By Henry E. Dresser, F.L.S., F.Z.S, etc. (London: The Author, 110 Cannon Street.)

We have received Part 1. of this work, which, when completed, will be regarded as a fitting corollary to the author's grand work on the "Birds of Europe." Mr. Dresser has been experimenting for some years with the three-colour process as applied to the delineation of bird's eggs, and has adopted that process for the reproduction of his plates. There can be no doubt that if a high standard of artistic excellence can be attained a photographic process has much to recommend it, for it gives an absolutely faithful reproduction of the egg to which it is applied. So far as the larger eggs are concerned, it may at once be said that they are most excellent—absolutely faithful portraits of specimens carefully selected with a view to illustrating the variation in size, form, and colour to be found in the eggs of each species. When we come to the smaller

eggs, such as the Warblers, it may be doubted if the results, good as they are, are equally satisfactory, but this may be due to the fact that they are too crowded together on the plate, and hence do not appear to the same advantage as the eggs of the larger species—a matter worthy of attention in future plates.

In addition to the fine plates, there is a series of excellent text illustrations devoted to the nests of each species where possible to obtain them. The accompanying letterpress furnishes full information on nomenclature, names of species in many languages, distribution, nesting habits, descriptions of nests and eggs, etc.

An up-to-date book on the eggs of European Birds has been a desideratum for the last half century. It is supplied by the book under notice in a way that has never before been possible, either from the standpoints of pictorial excellence and wealth or in thoroughness of treatment. The work will be issued in parts at intervals of about two months, and will be completed in about twenty quarto parts at 10s. 6d. each.

OOTHECA WOLLEYANA; AN ILLUSTRATED CATALOGUE OF THE COLLECTION OF BIRD'S EGGS FORMED BY THE LATE JOHN WOLLEY, JUN., M.A., F.Z.S. Edited from the original notes by Alfred Newton. Part III. (London: R. H. Porter, 1905.) Price £2:2s.

The penultimate part of this work has quickly followed Part II., and will be heartily welcomed by all those who are acquainted with the many excellences of the book. Part III. deals with the orders from Columba to Alca, and thus includes the great and singularly interesting one of Limicolæ. Apart from the wealth of original information and delightful field notes, this instalment is quite remarkable for the number and beauty of the plates, eight in number, devoted to the eggs of the Great Auk. Not only are eight specimens depicted, but each is figured from two points of view; and never before have we had such a gallery of portraits of the eggs of *Alca impennis*, and never before have the eggs of this bird been painted by such a master of detail as Mr. Grövnold has proved himself to be. Prof. Newton is much to be congratulated on the great excellence and attractiveness of the number.

THE TRAVELS OF A NATURALIST IN NORTHERN EUROPE. By J. A. Harvie-Brown. With coloured plates and other illustrations and 4 maps. (London: T. Fisher Unwin, 1905.) Price £3:3s.

Our co-editor in Zoology, Mr. Harvie-Brown, has published an account of his three ornithological journeys in northern Europe. These form two handsome volumes, wherein are given the experiences and successes of their author and his companion during each of the expeditions. The work is divided into three parts. The first deals with the trip to Norway undertaken along with the

late Mr. E. R. Alston in 1872; the second to Archangel with the same well-known naturalist in 1873; and lastly the more adventurous and important one to the valley River Petchora, and its fringing arctic tundras, in company with the late Mr. Henry Seebohm in 1875. This last trip was a memorable one, and resulted in discoveries of great interest to ornithologists. The accounts are given in diary form, and are reproduced just as they were written; a method of treatment which has its recommendations but also its failings. As regards the former, they possess the quality of freshness which alone appertains to accounts written amid the scenes they describe; while the drawbacks are that they may at times lack polish, and are apt to include items considered trivial by those not immediately concerned.

W. E. C.

I GO A-WALKING THROUGH THE COUNTRY LANES, THROUGH THE MEADOWS, AND BY STREAM AND LAKE. (Edinburgh: T. N. Foulis.

Under this title have been issued three parts forming a thin volume, devoted to depicting country-life and natural history subjects, chiefly the latter. The pictures are the main features of the work, and these are excellent reproductions of a series of charming photographs by Mr. Charles Reid of Wishaw, who is deservedly well-known for the high standard and painstaking nature of his work. The booklet contains 74 attractive pictures, chiefly of birds and nests, not a few mammals, and some pretty rural scenes; and suitable explanatory letterpress. The price is 1s. 6d. for the three parts, and to those interested in the results of the application of photography to such subjects nothing better can be had.

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[APRIL

ON THE MAMMALS OF FAIR ISLE, WITH A
DESCRIPTION OF A NEW SUB-SPECIES OF
MUS SYLVATICUS.

By NORMAN B. KINNEAR.

AS mentioned by Mr. Eagle Clarke in the January number of the "Annals," we brought back from Fair Isle a small series of mammals consisting of House- and Field-mice. Besides these two species, the Rabbit (*Lepus cuniculus*) is also found on the island, but we were unable to learn anything about its introduction. Off the shore, chiefly at the north end, a small number of Common Seals (*Phoca vitulina*) and a few Grey Seals (*Halichærus grypus*) were generally to be seen, but although they are not disturbed, they are not very numerous. The rocky nature of the coast and the absence of a proper harbour has, so far, hindered the introduction of the Rat, Brown or Black.

By means of traps we captured a series of mice which present some points of interest, especially the Field-mice.

HOUSE-MOUSE (*Mus musculus*, Linnæus).—At first we found the House-mouse very numerous among the crofts, but after the corn was cut they left the fields and betook themselves to the houses, where we were informed they

remained for the winter. In all we obtained eight specimens of various ages. The average measurements of the four largest are in excess of the average for mainland specimens, and in colour they are rather more tawny, but the differences are not sufficiently marked to allow them to be separated from *Mus musculus* proper.

We also found the Field-mouse very plentiful in the crofts, but it was not confined to the cultivated ground like the House-mouse, for we caught several examples among the short heather on the higher parts of the island near the north end. The natives say they kill numbers in their corn stacks when thrashing during the winter.

Out of the thirteen specimens brought home, six are adult, and anyone acquainted with the ordinary Field-mouse of the mainland is at once struck by their large size and rich colouring.

Before proceeding to a detailed description of these Fair Isle mice, it may perhaps be as well to state briefly the distinguishing characteristics of the various sub-species of Field-mouse found in the British Isles. Captain Barrett-Hamilton, in his paper¹ "*On Mus sylvaticus and its Allies*" describes five sub-species as found in Great Britain.² These are as follows:—

1. *Mus sylvaticus intermedius*, Bellamy. This is the ordinary form of Field-mouse found throughout the British Isles (except where its place is taken by other forms) and parts of the continent.
2. *Mus sylvaticus celticus*, Barrett-Hamilton. A dark small-bodied Field-mouse, with a rather larger ear and foot, in proportion to its size, than *M. s. intermedius*. Found in the west of Ireland, Skye, the Outer Hebrides and, according to Mr. J. G. Millais,³ in the north of Shetland.
3. *Mus sylvaticus hebridensis*, De Winton. A larger and stouter built Field-mouse than *M. s. intermedius*, with proportionately smaller ears, larger feet and shorter and thicker tail. The colour of the upper side is hardly so bright as in *intermedius*, and the under-side is "generally dusky or

¹ "P.Z.S." 1900, pp. 387-428.

² *Mus sylvaticus typicus*, Linnæus, the type of this species is found in Norway, Sweden, parts of Denmark, and perhaps the southern shores of the Baltic.

³ "Mam. Great Britain and Ireland," ii. p. 185.

sandy, with no distinct line of demarcation." It is confined to the islands of Lewis and Barra in the Outer Hebrides.

4. *Mus sylvaticus hirtensis*, Barrett-Hamilton. This sub-species is very like *M. s. hebridensis*, but can be distinguished by its "slightly larger size and greater amount of buff or yellowish-brown colour on the under-side." Only known from the island of St. Kilda.
5. *Mus sylvaticus wintoni*, Barrett-Hamilton. This is a large, well-developed Field-mouse, much brighter in coloration, both on the upper and under sides, than *M. s. intermedius*. At all ages there is a distinct breast-band across the chest, with a "longitudinal stripe in the centre extending forward about 5 mm. and back along the sternum about 10 mm." This mouse is found in small colonies scattered over England, chiefly in the south, and in the western parts of Europe.

In form and proportions the Fair Isle mice more closely resemble *M. s. wintoni* than either *M. s. hebridensis* or *M. s. hirtensis*, but differ from that form in having a smaller ear, in which respect they approach *hebridensis*: the tail is considerably longer than in either *hebridensis* or *hirtensis*, and the hind-foot is smaller but quite as stout as in both these forms. The head and body measurements of the two largest examples in the series, male and female, are 121 mm. and 115 mm. respectively, as compared with 112 mm. in *hebridensis*, 110 in *hirtensis*, and 115 in *wintoni*, the measurements of the largest examples given in the above paper.

In coloration the Fair Isle form is richer than *M. s. intermedius*, but not so bright as *wintoni*, and without the yellow breast-band characteristic of the latter sub-species. The line of demarcation is very distinct, and the under-side is white, showing no trace of the buff found in *hebridensis* and *hirtensis*.

Captain Barrett-Hamilton has shown¹ that among the results produced by isolation is a shortening of the ear and lengthening of the hind-foot, but in the Fair Isle mice, though the shortening of the ear is noticeable, it is not accompanied with an increase in size of the hind-foot, as is the case in the mice from the Hebrides and St. Kilda, while there is no tendency to become buff on the under-side like

¹ "P.Z.S." 1900, p. 395.

the mice of the above-mentioned islands. These two points, I think, show that the Fair Isle mice are varying along a different line from either *hebridensis* or *hirtensis*.

I have not been able to examine a very satisfactory series of Field-mice from Orkney and Shetland, but the average measurements show that the mice of these islands have a slightly larger hind-foot and ear than in *M. s. intermedius* from the mainland, and probably these differences would be more noticeable in a larger series.

In neither of these Archipelagos are the mice so rich in colour, especially on the flanks, as in the specimens from Fair Isle.

Taking into consideration these differences, I think the Fair Isle mice are quite entitled to be ranked as a sub-species, and therefore I propose the name of—

MUS SYLVATICUS FRIDARIENSIS,¹ sub-spec. nov.

Type, a male in the Royal Scottish Museum.

Distinguishing Characteristics.—A large, well-developed *M. s. intermedius*, resembling in size and proportions *M. s. wintoni*, except in the case of the ear, which is smaller. In coloration rather richer than *M. s. intermedius*, especially on the flanks, and with a distinct line of demarcation between the upper and under sides.

Skull, a large edition of *M. s. intermedius*, from 28 to 28.5 mm. in length.

For comparison I give the measurements of the various British sub-species.

	H. and B.	Tail.	Hind-foot.	Ear.
<i>M. s. intermedius</i> ² (62 ♂s) . . .	92.6	88.2	22.6	15.4
<i>M. s. celticus</i> ² (2 ♂s and 4 ♀s) . . .	85.3	80.8	22.3	14.6
<i>M. s. hebridensis</i> ² (3 ♂s and 1 ♀) . . .	108	97.5	24.25	15.75
<i>M. s. hirtensis</i> ³ (5 ♂s and 5 ♀s) . . .	104	100	24.7	16.25
<i>M. s. wintoni</i> ² (1 ♂ and 3 ♀s) . . .	110.75	111.75	23.75	18
<i>M. s. fridariensis</i> (4 ♂s and 2 ♀s) . . .	109	108	23.58	16.6

In conclusion I have to thank Captain Barrett-Hamilton for help in working out this sub-species.

¹ Fair Isle is the Fridarey of the Orkneyinga Saga. This name was suggested to me by Mr. Eagle Clarke.

² "P.Z.S." 1900, pp. 423-425.

³ "Ann. Scot. Nat. Hist." 1906, p. 3.

THE BIRDS OF FAIR ISLE, NATIVE AND
MIGRATORY.

By WM. EAGLE CLARKE, F.R.S.E., F.L.S.

(Continued from p. 21.)

WHEATEAR, *Saxicola ananthe*.—The Wheatear is a summer visitor to the island, and is common ; but the large numbers present, during the first half of September included, no doubt, many birds on their passage southwards. There was a marked decrease on the part of this and other migratory birds on 15th September. There were fresh arrivals on the 25th, which, however, soon departed, but a few representatives of the species were still present down to 7th October, the day of our leaving the island. A few males with vestiges of their summer dress were seen during the early days of September.

THRUSH, *Turdus musicus*.—On our arrival and down to 16th September we constantly saw one or more Thrushes in a ravine formed by the course of one of the burns on the east side of the island. We were somewhat puzzled in what light to regard these birds, but the matter was set at rest on the date named by the shooting, on suspicion, of a bird which proved to be a young Thrush only recently out of the nest ; and thus the breeding of this species on the island was established. This interesting fact created some surprise among the Natives, and led to inquiries among themselves, which elicited the information that the Mavis had been seen in the ravine throughout the summer.

The Thrush is common on passage. The first birds of the autumn of 1905 appeared on 13th September, and were followed by others on the 16th ; on which day they were more abundant than at any other date during our stay. A few were observed down to 4th October.

REDWING, *Turdus iliacus*.—This was another of the migrants which appeared with, and participated in, the great rush of 23rd and 25th September, though it was not very numerous. The greatest immigration of this species during our visit took place on the night of 2nd October, and on the 3rd small flocks containing a score or more of these birds were seen. The species was present in fair numbers on the following days, *i.e.*, down to our departure.

FIELDFARE, *Turdus pilaris*.—This species occurs commonly on passage, but had not appeared by the end of the first week of October, and thus did not come under our notice. Mr. George

Stout chronicles its appearance for 25th October, on which date we saw a party of thirty. These were followed by larger flocks, accompanied by Redwings, Blackbirds, and Bramblings on the 29th.

BLACKBIRD, *Turdus merula*.—The Blackbird is a visitor on passage, and also a winter guest in small numbers. During our stay its movements were of an initial nature, for only single birds came under notice. The first, a young male, appeared on 14th September, and this was followed by birds of similar age and sex on the 18th. On the 25th an adult male was seen among turnips, along with warblers and other migrants. A considerable number were observed on 30th October, having arrived with large flocks of Fieldfares, Redwings, and Bramblings; and Mr. J. W. Anderson tells me that one or two passed the winter of 1905-6 on the island.

RING OUZEL, *Turdus torquatus*.—Ring Ouzels participated in the rush of migrants between 23rd and 25th September. They were not numerous, however, and did not seek the cultivated portion of the island, but were observed on the face of the cliffs and on the high heathery ground.

WREN, *Troglodytes parvulus*.—Fairly common, but only resident birds came under our notice. These were chiefly observed on the faces of the cliffs where scanty vegetation managed to exist, but the bird was also widely though thinly distributed over the island, frequenting the stone walls, and courses of the burns. No migrants appeared during the period covered by our visit.

GREAT SPOTTED WOODPECKER, *Dendrocopus major*.—Occurs occasionally in autumn. Mr. Tulloch has kindly sent me some feathers of this bird which he picked up on Fair Isle, in confirmation of its visit during his residence there.

WRYNECK, *Lynx torquilla*.—There must have been a considerable passage of Wrynecks just previous to our arrival at Fair Isle, for we found on three consecutive days, early in September, the remains of single birds in widely scattered localities, including the high and exposed moorland area. That we should have accidentally come across these recently deceased specimens plainly indicates that disaster in the shape of adverse weather had overtaken the birds on their autumnal journey southwards. This probably detained them on the island, which, from its exposed nature, is utterly unsuited to their habits and devoid of suitable food, and thus led to numbers perishing, for many dead birds must have escaped our notice.

NIGHTJAR, *Caprimulgus europæus*.—One came under the notice of Mr. Tulloch.

CUCKOO, *Cuculus canorus*.—Mr. Tulloch tells me that he saw a few on the island in September.

SEA EAGLE, *Haliaeetus albicilla*.—A banished resident. Mr. Stuart Wilson, the second oldest man in the island, told me that the Sea Eagle formerly nested on the Sheep Craig, and continued to do so during the early decades of the nineteenth century. His mother had informed him that she remembered one of the Eagles seizing a domestic duck and carrying it off for its young on the Sheep Craig, and that lambs were frequently requisitioned for a like purpose. Mr. Wilson is 65 years of age, and his mother, who was born in 1805, was a young woman when she witnessed the incident narrated. This would make the date of the event about 1825, and it is between that year and 1840 that the bird ceased to breed, for it was no longer a native when Mr. Wilson was born. There is another site of a former eagle's eyrie on the island, though whether two pairs bred or whether it was an alternative nesting place is uncertain. No doubt the taking of lambs would lead to the bird's destruction, as soon as means were found to accomplish it. There is an eminence on the east side of the island called Erne Hill or Brae.

PEREGRINE FALCON, *Falco peregrinus*.—Two pairs nest on the island. Single birds were seen almost daily by us, but the young had evidently been driven off before our arrival, for adults only were observed. Writing in 1700, the Rev. John Brand in his "Brief Descriptions of Orkney and Zetland," tells us that it was reputed that the Hawks "which are to be had in the Fair Isle, are the best in Britain, which use to flee to Zetland, or Orkney for their prey, these being the nearest lands, and sometimes they'll find Moor Fowls in their nests, which they behoved to bring from Orkney, seeing there are none in Zetland, and the nearest isle they could have them in, was Stronza or Westra, which is between 40 and 50 miles of sea, over which at one flight they must carry these fowls to their nests."

MERLIN, *Falco aesalon*.—Single birds were seen on the 11th and 12th September (probably the same individual), and another on 4th October. They were doubtless on passage.

KESTREL, *Falco tinnunculus*.—Female Kestrels, possibly the same bird, were observed almost daily from 16th September to 3rd October. When seen the bird was generally in pursuit of small birds, such as Twites, and it was occasionally mobbed by a few Grey Crows.

CORMORANT, *Phalacrocorax carbo*.—A very common resident species. Great numbers evidently nest at Fair Isle.

SHAG, *Phalacrocorax graculus*.—Extremely abundant, more so than the last species, and resident all the year round.

GANNET, *Sula bassana*.—Was observed fishing off the island during the period covered by our visit. They were most numerous during the earlier part of September, after which their numbers gradually decreased, though a few were still present in the first week of October. According to Mr. George Stout, the bird is occasionally seen during winter, but such visits are by no means of common occurrence.

HERON, *Ardea cinerea*.—The Heron was occasionally observed, being probably on passage. Five or six were present on our arrival, and afterwards single birds were seen until 23rd September. On this date six appeared, but these, like their precursors, soon passed on, to be followed again by odd birds down to the date of our departure. During their short sojourn these visitors frequented the rock pools at the southern end of the island.

WILD GOOSE, *Anser sp.*—We were informed that “Wild Geese” are not uncommon during the autumn, and two were reported to us as having been seen on 2nd October.

Mr. Tulloch includes the White-fronted Goose (*Anser albifrons*) in the list of Fair Isle birds observed by him.

MALLARD, *Anas boschas*.—A few frequented the pools on Sukka Moor, or were seen on the sea close to the island, at intervals throughout our stay. A party of nine, noted on 17th September, was the largest number observed. Mr. George Stout informs me that though it is not regularly present during the winter, yet it is sometimes common enough at that season.

TEAL, *Nettion crecca*.—A few, chiefly single birds, came under notice between 6th and 19th September, and frequented ditches among the crofts or the lochans at the north end of the island. Two were observed in the south harbour on 16th September. None were seen later.

WIGEON, *Mareca penelope*.—From 9th September onwards small parties, never exceeding six individuals, were observed in the lochans and drains, or on the sea off the mouths of the burns, where they consorted with Mallards. According to Mr. George Stout, Wigeon are sometimes common enough in winter, but are not regularly present. He saw thirty on 27th October.

EIDER DUCK, *Somateria mollissima*.—Abundant and nesting, but less numerous in winter. It was common just off the island throughout our visit. In the middle of September chicks only a few days old were seen; and during the month males in interesting stages between eclipse and full plumage were frequently observed.

LONG-TAILED DUCK, *Harelda glacialis*.—A bird of the year appeared at the North Haven on 3rd October.

RED-BREASTED MERGANSER, *Mergus serrator*.—Several females, or immature males, were observed in the North and South Havens. The first of these appeared on 17th September and was followed by other single birds down to the date of our departure, 7th October.

RING DOVE, *Columba palumbus*.—A fine adult example was seen among the crofts on 25th September, a day of many migrants. Another was seen on the 27th in a geo on the east side of the island. We were informed that the Ring Dove was observed not uncommonly on passage. A single bird is scheduled by Mr. George Stout for 4th November.

ROCK DOVE, *Columba livia*.—The absence of the Rock Dove from an island affording so many ideal nesting haunts was a matter of much surprise and comment, but on inquiry we found that it was formerly a resident and had only recently ceased to be a native bird. Until some ten years ago it was quite abundant, nesting in the numerous caves and fissures in the cliffs all round the island. Now not even a straggler is to be seen in the haunts that once knew these birds so well. It was, however, subject to some persecution. For instance, a number were captured in certain caves at night by placing a sail over the mouth of their retreat and then lighting a lantern, on which the frightened birds dashed against the obstruction in their endeavours to escape and were secured. As many as sixteen birds have been secured in a single cave by this means. The caves, however, where it was possible to practise this method were very few, and hence it was comparatively a harmless proceeding, and one which cannot be regarded as having contributed to the extermination of the species; indeed it was a method of capture which had been in vogue for many years without inimical results. The Doves were also shot on the stubbles, where as many as forty have been seen together, and in this connection the introduction of guns by the light-keepers is said by the Natives to have finally encompassed the destruction of the bird.

I am inclined to think that their extinction may have been brought about by scarcity of food. The bird is essentially a feeder on the land, and the limited area under cultivation, which has been much reduced in recent years, would only support a comparatively small stock of these pigeons, especially in the winter. It is significant that the evidence obtained points to the year 1895 as being about the date of the bird's extinction. It will be remembered that the winter of 1894-5

was one of extreme severity for a prolonged period, during which the cold was intense—greater than had been experienced in Scotland for forty years—as many as 40° of frost having been registered, and the ground was ice-bound for several weeks. It was a winter of great disaster to many ground-feeding species, and it is possible that the Fair Isle Rock Doves were among its victims.

QUAIL, *Coturnix coturnix*.—We were shown, and purchased, eleven eggs of this bird, which had been taken in July last from a nest among rough grass bordering a plot of corn. The nest was found accidentally, and both the eggs and bird were unknown to the Natives. The Quail breeds not infrequently in Shetland; and perhaps also on Fair Isle.

WATERHEN, *Gallinula ochropus*.—This species is said to be an occasional visitor to the Isle. Mr. George Stout has sent me one which was obtained on 15th January, 1906.

CORNCRAKE, *Crex crex*.—Is an annual summer visitor, but had departed ere we arrived on 2nd September.

GOLDEN PLOVER, *Charadrius pluvialis*.—The Golden Plover was observed on its southern passage down to 30th September. It chiefly arrived in small parties, but on the 14th many which had appeared over night were seen in all parts of the island. All these migrants remained one day only for food and rest, and had resumed their journey before the following morning. There is much ground on the island well suited for breeding haunts, but the bird seems to be quite unknown as a native species present or past. Perhaps the presence of the Peregrines may account for the absence of this and other species during the nesting season.

RING PLOVER, *Ægialitis hiaticula*.—A small party consisting of old and young birds was seen daily down to the third week of September, when they took their departure. The Ring Plover is a summer visitor to the Isle in limited numbers, and the birds seen by us were probably the native contingent and their progeny of the year.

LAPWING, *Vanellus vanellus*.—Mr. Anderson, ground officer, informed me that a few Lapwings breed irregularly on the island, and that he had found their nests with eggs. Any that may have nested in 1905 had taken their departure before our arrival, after which only a few single birds on passage came under notice. The first of these appeared on 11th September and evidently passed on at once, as it was not observed afterwards; others, also single birds, were seen on the 26th, 27th, and 29th, but possibly the same bird came under notice on each of these dates. According to information supplied by Mr. George

Stout, two appeared on 11th October, and on the following day "a very large flock." A single bird was seen on 18th January 1906.

TURNSTONE, *Streptilas interpres*.—The first birds of this species were observed on the beach at the south harbour on 4th September, but they soon passed on. On the 10th two were seen on the stony summit of a hill fully 500 feet high, on the west side. After this date a few arrived at intervals, down to our departure, but none of them remained for more than a day or two.

OYSTERCATCHER, *Hematopus ostralegus*.—A summer visitor nesting in limited numbers. Small parties were present during our visit, and the bird was still to be seen down to 7th October, the day on which we left, though its members were then decidedly fewer than during the early days of our sojourn. Mr. G. Stout says that it is seen on rare occasions in the winter, but only remains for a day or so.

WOODCOCK, *Scolopax rusticula*.—The first Woodcock of the past autumn appeared after our departure, namely on 16th October, and I have to thank Mr. J. W. Anderson for having sent me one of them. This species occurs annually on the fall passage, and in some seasons is very abundant.

Mr. Tulloch tells me that he shot thirty-five in one day in November 1902, and thirty-eight in a single day in the following year. The best time, he considers, is about 1st November. Later in November there was always an odd bird to be found with an easterly wind. When the Woodcock came to the island in numbers there were a great many Peregrines at the same time, and Mr. Tulloch observed Woodcock's feet and feathers all over the island, and it appeared to him that the Falcons had followed the Woodcocks on their passage to the island.

COMMON SNIPE, *Gallinago gallinago*.—This species was not uncommon. The birds observed were on passage, and did not tarry long, but came and went in quick succession, and there were few days between 4th September and 6th October on which we did not see them. The bird was most numerous on 6th September, when it was found everywhere, even among the crofts, and great numbers must have been present. There were also decided movements on the 18th and 25th of September. Mr. George Stout tells me that in some winters one or two Snipe are seen occasionally.

JACK SNIPE, *Gallinago gallinula*.—The first Jack Snipe was seen among turnips on 19th September, and on the following day it was numerous, being observed in all parts of the isle. After this date there were small arrivals down to 3rd October.

DUNLIN, *Tringa alpina*.—A few (never more than three on any one day) were seen on passage during September. Four specimens were obtained, two of which belong to the remarkably small race known as Schinz's Sandpiper; while the others, also a pair, are equally interesting on account of their unusually long bills and tarsi.

LITTLE STINT, *Tringa minuta*.—A single bird only came under notice. This was first seen on 10th September, and during that and the following day frequented a small pool of fresh water at the south-east of the island. It was quite tame and allowed a close approach.

PURPLE SANDPIPER, *Tringa striata*.—The first bird of the season appeared on the rocks at the North Haven on 2nd October. Several had arrived by the 7th, and two shot on that day were given to us by Mr. J. W. Anderson.

SANDERLING, *Calidris arenaria*.—Four were seen on 9th and 10th September, and frequented the small strip of sand which fringes the North Haven. One was observed on a pool of fresh water on the 12th, and was the last Sanderling noted.

RUFF, *Machetes pugnax*.—The Ruff is a bird of passage. One or more small parties consisting of three or four individuals were present when we arrived, and remained until 12th September, when they passed on. During their stay these birds frequented the dry grassy slopes bordering the cliffs, and one only was observed on marshy ground.

COMMON SANDPIPER, *Totanus hypoleucus*.—This species was observed on passage from the date of our arrival, 2nd September, down to the 19th of the month, when the last of these travellers was seen. At first it was fairly common, and was to be seen flitting about the rocks at the base of the cliffs all round the island, and now and then by the burn-sides. These birds never foregathered, but were always observed singly—a fact which I have noted both at home and abroad regarding this species during its autumn passage.

REDSHANK, *Totanus calidris*.—This bird is a winter visitor and bird of passage, arriving in the early autumn. A few were always to be seen about the rocks at the South Haven and near the Skadan Lighthouse. Their numbers did not seem to vary much during the period covered by our visit.

GREEN SANDPIPER, *Totanus ochropus*.—From the 2nd to 8th September one, perhaps two, of these birds frequented the courses of the burns on both the east and west sides of the island. The Green Sandpiper has not hitherto been recorded for either the Shetlands or Orkneys, and hence the record is

an interesting one, though not at all surprising since the species is a common summer visitor in Scandinavia. The probability is that its main lines of flight across the North Sea in both spring and autumn lie further south, as in the case of other species, and not *via* the Northern Isles.

CURLEW, *Numenius arquata*.—The Curlew was fairly numerous on passage during the first week of September, but after that its numbers fell off, and only a few were seen at intervals. There is much suitable ground on the island for the nesting of this species, and yet the bird (like the Golden Plover and others) does not, and, so far as we could ascertain, never has bred on Fair Isle. The Peregrines, as before mentioned, are probably accountable for this: they would kill off any that attempted to remain.

WHIMEREL, *Numenius phaeopus*.—Single birds were seen at passage on 4th, 11th, and 15th September. This is another species for which the island offers suitable nesting grounds, and yet it breeds not, though it does in both Orkney and Shetland.

TERN, *Sterna sp.*—Mr. Stuart Wilson informed me that in his father's time, *i.e.* in the early decades of the last century, "Pictarrs" bred on some comparatively low-lying ground, now much resorted to for peat, but then under sward.

BLACK-HEADED GULL, *Larus ridibundus*.—This species came under our notice on three occasions, when single examples only were observed. These—an adult and two young birds—appeared on 2nd, 12th, and 23rd September, and frequented the crofts in search of food, but remained for a few hours only.

GREAT BLACK-BACKED GULL, *Larus marinus*.—We found young and old of this species to be fairly common. It breeds in numbers, and remains the winter.

LESSER BLACK-BEAKED GULL, *Larus fuscus*.—Several were observed on the day of our arrival, and the last of the season came under notice on the following day, 3rd September. After this date none were seen, though we were always on the lookout for them. It breeds commonly on the island, and is evidently a summer visitor only.

HERRING GULL, *Larus argentatus*.—A common resident, breeding in abundance on the cliffs and stacks. Many young birds were observed hanging about the houses on the lookout for scraps of food, and so dependent did they appear to be on charity, so to speak, that they seemed quite unable to shift for themselves, and thus numbers perished from sheer want of food. A case of cannibalism was noted on the part of this species, for we came upon an immature bird making a meal on the remains of a deceased comrade which had been killed, and its

breast alone eaten, by a Peregrine. This Falcon, since the Puffins and other "rock birds" had taken their departure, seemed very partial to young Herring Gulls.

COMMON GULL, *Larus canus*.—Only three examples were observed by us, namely one on 15th September, and two on the 22nd—all adults, and seen while seeking food on the land. We could not obtain any information regarding this bird as a breeding species.

KITTIWAKE, *Rissa tridactyla*.—This is the most abundant of the Gulls nesting on the island, and its chief haunts are the precipitous flanks of the picturesque Sheep Craig. It was present in numbers, but the birds seen by us were chiefly adults. At the Flannan Isles, in the latter part of September of the previous year, my experience was exactly the reverse, the few Kittiwakes seen being all immature. This discrepancy, if it may be so termed, between the two sets of observations is, no doubt, to be accounted for by the difference in food supply, which being greater at Fair Isle enables these birds to winter there, though at that season they are not numerous.

We had many opportunities of watching these birds capture their prey. When thus engaged they plunged into the water from a height of about thirty feet, and completely immersed themselves.

GREAT SKUA, *Megalestris catarrhactes*.—All the natives declared to us that they had it from their fathers that the "Bonxie" long ago bred on the island. They were unable to fix the date even approximately, but the fact has been handed down to them as part and parcel of the history of the Isle—a history in which all the children are well versed. There can be no doubt, I think, as to the accuracy of this traditional information, and, if confirmation be needed, we have it in the statement of Patrick Neill, who visited the Northern Isles in 1804. In his "Tour through some of the Islands of Orkney and Shetland, with a view chiefly to Objects of Natural History," published in 1806, Neill states (p. 90, footnote) regarding this species, that "its principal breeding-place is in the island of Faulah; but it breeds also in the Fair Isle, and in one or two other places."

From personal knowledge of the haunts of this interesting bird, I consider that Fair Isle affords ideal breeding grounds,—high heathery sheep walks closely resembling its favourite haunts in the not-far-off Island of Foula.

Mr. Tulloch tells me that when stationed at Fair Isle he observed numbers of this Skua passing northwards in spring, but that he never saw any passing southwards in the autumn.

ARCTIC SKUA, *Stercorarius crepidatus*.—This bird formerly bred in some numbers on the island, but is now reduced to a single pair, which nests on the hill above the North Haven. The Fair Isle name for this species is the Q (? queue). The native birds had departed before our arrival.

In the summer of 1905 one of the birds broke its wing while striking a dog which had ventured near the nest.

GUILLEMOT, *Uria troile*.—This bird breeds in great numbers on the cliffs and sides of the numerous stacks, but had quitted its native haunts ere we arrived. Two only were seen by us, and one of these was still in deep moult on 16th September, its feathers lying around it on the rock upon which it was seated. The other was observed on the sea at the North Haven. A few are seen off the island during the winter by the Natives when engaged at the fishing.

RAZORBILL, *Alca torda*.—This species breeds in abundance, but like the last had quitted its nesting haunts before September set in. Single birds were seen by us on the North Haven on 1st and 6th October, and two appeared at the same place on the 4th. A few are seen off the island in winter by the fishermen.

BLACK GUILLEMOT, *Uria grylle*.—A common resident species, finding abundant nesting sites in the crannies of the cliffs. It was to be seen in numbers on the sea close to the island during the entire period covered by our visit, and Mr. G. Stout alludes to it as common in his list of winter birds.

LITTLE AUK, *Mergulus alle*.—A regular and common winter visitor to Fair Isle seas. The first for the autumn of 1905 is recorded by Mr. George Stout for 8th November. Mr. Tulloch informs me that many are killed in winter by the Great Black-backed and Glaucous Gulls.

PUFFIN, *Fratercula arctica*.—The only Puffin seen was observed off the cliffs on the east side of the island on the day of our arrival. This species breeds in vast numbers on the cliffs and grass-topped stacks, indeed it is much the most abundant of all the Fair Isle birds, but all save the solitary example alluded to had moved out to sea for the winter ere September set in. Mr. George Stout informed me that an albino example was several times seen in August last.

STORM PETREL, *Procellaria pelagica*.—Mr. Tulloch tells me that he found a number nesting at the north end of the island, and it is well known to the Natives as a breeding species.

FULMAR PETREL, *Fulmarus glacialis*.—Formerly this species was only an occasional visitor to the island, now it is an abundant

summer visitor. The exact date of its appearance as a nesting bird is a little uncertain, but only dates some three or four years back. In 1902, Mr. Tulloch informs me, it was present during the summer, but no nests were observed; but in 1903 about a dozen pairs bred on the cliffs at the N.W. end of the island, and probably also at the Sheep Craig, where a good number were observed. Since then it has thoroughly established itself, and breeds in suitable places, which are very many.

The extension of the range of the Fulmar to Fair Isle and the Western and Northern Isles of Scotland, as well as to the north coast of the mainland, may be due to the congestion that has probably taken place in St. Kilda, which until a quarter of a century ago was its only native British habitat. During recent years the human population of St. Kilda has markedly decreased, and this, taken with the fact that the people are no longer dependent on the Fulmar for food to the same extent as formerly, has led to fewer of these birds being killed, and hence a considerable increase in their numbers would naturally result, and the seeking of new haunts become a necessity.

At the close of the nesting season the Fair Isle birds evidently soon take their departure, for we only saw a few, namely the 2nd and 3rd of September, and none afterwards, though we kept a careful lookout for them. We were informed, however, that it is occasionally seen in winter.

LITTLE GREBE, *Podiceps fluvialis*.—Both Mr. Tulloch and Mr. J. W. Anderson tell me that the Little Grebe occurs in the lochans in the autumn.

SLAVONIAN GREBE, *Podiceps auritus*.—A pair of these birds appeared in the South Haven on 6th October, and a pair, perhaps the same, was observed in the North Haven on the 4th. Single Grebes are recorded in the schedules by Mr. George Stout for 10th and 18th October; and Mr. J. W. Anderson reports three during February. Probably all these observations relate to this species.

ADDENDUM.

TREE PIPIT, *Anthus trivialis*.—A male was shot on 30th September, and was by an oversight omitted from its proper place in this list. This species is an addition to the avifauna of Shetland, and Mr. Ranken appears to be the only person who has ever observed it in Orkney. It probably occurs on passage in both spring and autumn in the Northern Isles, but has hitherto been overlooked.

NOTES ON SOME COLEOPTERA FROM
FAIR ISLE.

By Prof. T. HUDSON BEARE, B.A. B.Sc.

DURING his stay on Fair Isle in the autumn of 1905, for the purpose of studying bird migration, Mr. W. Eagle Clarke collected Coleoptera, and I have now had the opportunity of going through this interesting collection in order that I might name the captures.

Fair Isle was described by Mr. Clarke in the last number of "The Annals," so that no further remarks on its physical features and geographical position are necessary.

I give a complete list of all the species in the collection, with some notes as to their general distribution in Great Britain. The numbers in brackets after the specific names indicate the number of specimens of the species in the collection, and therefore give some indication as to the relative abundance of the different species on the island. It will be noticed that, with one exception, the species found by Mr. Clarke are common throughout the entire kingdom, being quite as abundant in the South as in the North. The one species, which is a subalpine form, viz., *Otiorhynchus blandus*, Gyll., appears to be quite common all over Scotland, especially near the coast. I have taken it in plenty on the island of Inchkeith.

As perhaps might be expected, practically all the species in the collection are dark coloured, mostly quite black, and there is a distinct tendency for the specimens to be rather smaller than the ordinary forms which occur on the mainland. This is especially noticeable with the four examples of *Chrysomela staphylæa*, L.; the specimens of this species in the collection are also somewhat dull and not so glossy as specimens which occur on the mainland.

There is one other point to which it is worth drawing attention, and that is the very large number of specimens of the big Staphylinid *Ocypus olens*, Mull. In my experience this is by no means a very abundant beetle in Scotland, and it is therefore very interesting to find it occurring on

this small island, where Mr. Clarke informs me it is very common and is quite a pest in the houses of the inhabitants.

LIST OF SPECIES AND NOTES ON THEIR DISTRIBUTION.

1. *Carabus catenulatus*, Scop. (12).—Common throughout the kingdom.
2. *Notiophilus biguttatus*, F. (2).—Common throughout the kingdom.
3. *Loricera pilicornis*, F. (16).—Common throughout the kingdom, except in the extreme North of Scotland.
4. *Nebria brevicollis*, F. (24).—Common throughout the kingdom.
5. *Pterostichus niger*, Schal. (13).—Common throughout the kingdom.
6. *Pterostichus nigrita*, F. (4).—Common throughout the kingdom.
7. *Amara aulica*, Pz. (1).—Common throughout the kingdom ; but not recorded in the extreme North of Scotland.
8. *Amara apricaria*, Pk. (3).—Common throughout the kingdom ; but not recorded in the extreme North of Scotland.
9. *Calathus cisteloides*, Pz. (20).—Common throughout the kingdom.
10. *Calathus melanocephalus*, L. (3).—Common throughout the kingdom.
11. *Anchomenus albipes*, F. (5, immature).—Common throughout the kingdom.
12. *Bembidium littorale*, Ol. (38).—Common throughout the kingdom.
13. *Bembidium bruxellense*, Wesm. (1).—Local throughout England and common in the Lowlands.
14. *Trechus minutus*, F., var. *obtusius*, Er. (1).—Commoner than the type in Scotland.
15. *Aleochara succicola*, Thoms. (1).—Common throughout the kingdom.
16. *Tachyporus hypnorum*, F. (1).—Common throughout the kingdom.
17. *Tachinus rufipes*, De G. (4).—Common throughout the kingdom.
18. *Quedius tristis*, Gr. (1).—Really common in Scotland, though Fowler says it is not.
19. *Quedius molochinus*, Gr. (1).—Common throughout the kingdom.
20. *Creophilus maxillosus*, L. (1).—Common throughout the kingdom.
21. *Ocyptus olens*, Mull. (19).—Common throughout the kingdom.
22. *Cafius xantholoma*, Gr. (16).—Abundant on the coast throughout the kingdom.

23. *Xantholinus glabratus*, Gr. (25).—Common throughout England, only recorded from Shetland, Solway, Clyde, in Scotland, but probably occurs all over the country.
24. *Xantholinus linearis*, Ol. (1).—Abundant throughout the kingdom.
25. *Othius fulvipennis*, F. (1).—Scarce, but widely distributed; occurs in Shetland Islands.
26. *Lathrobium fulvipenne*, Gr. (5).—Abundant throughout the kingdom.
27. *Otiorhynchus blandus*, Gyll. (11).—A subalpine species; common throughout Scotland.
28. *Sitones flavescens*, Marsh. (2).—Common throughout the kingdom.
29. *Aphodius contaminatus*, Hbst. (1).—Common throughout the kingdom.
30. *Aphodius punctato-sulcatus*, Stm. (2).—Common throughout the kingdom.
31. *Geotrupes sylvaticus*, Pz. (1).—Common throughout the kingdom.
32. *Chrysomela staphylea*, L. (4) (the specimens run very small).—Common throughout the kingdom.
33. *Silpha opaca*, L. (1).—Local in England, rather common throughout Scotland.
34. *Choleva grandicollis*, Er. (2).—Local, but widely distributed throughout the kingdom.
35. *Agabus bipustulatus*, L. (1).—Common throughout the kingdom.

THE UNIVERSITY, EDINBURGH.

SOME INVERTEBRATA, INCLUDING *IXODES* *BOREALIS*, FROM ST. KILDA.

By WILLIAM EVANS, F.R.S.E.

MR. JAMES WATERSTON, M.A., Edinburgh, has handed to me for determination a small miscellaneous collection of Invertebrates, which he made at St. Kilda between 11th June and 10th July 1905. Every item of information concerning the fauna of an isolated and out-of-the-way place like St. Kilda is of interest, and the present collection is the more valuable in that it contains representatives of groups

not hitherto reported from the locality. Most of the species represented are common, and generally, or at any rate, widely distributed in Britain, and the examples in the collection present no peculiarities, so far as I can see. Perhaps the most noteworthy species in the list is *Ixodes borealis*, Kram. and Neum., a tick, parasitic on sea-birds, which, so far as I know, has not before been recorded from Scotland, and only once from England.

OLIGOCHÆTA.

Lumbricus rubellus, Hoffm.—An earthworm in the collection is referred by Mr. Beddard to this common and widely distributed species.

CRUSTACEA.

Three terrestrial Isopods, all common British species, are represented, namely :—

Trichoniscus pusillus, Brandt.—One specimen.

Philoscia muscorum (Scop.).—Several.

Porcellio scaber, Latr.—Several.

There are also examples of two Amphipods obtained, Mr. Waterston tells me, in the "Glen" burn some distance above its junction with the sea, namely :—

Gammarus duebeni, Lillj.—Three.

Orchestia littorea (Mont.).—Two of each sex. The former is a brackish-water form recorded from both sides of Scotland, and perhaps takes the place of *G. pulex* in St. Kilda. The *Orchestia* is a common "hopper" on our shores at about high-water mark.

ARACHNIDA.

Order ACARIDEA.

The Mites represented are :—

Trombidium holosericeum (Herm.).—Two specimens.

Rhyncolophus regalis, Berl.—One. Agrees well with specimens from sand-hills, Fife, named for me last summer by Dr. Michael. I have also found it at a considerable elevation on the Perthshire hills near Killin.

Calypstostoma hardii, Cambr.—I was delighted to find a specimen of this curious mite in the collection. Originally recorded from the Cheviot Hills, it has since been found by me high up on Am Binnein, West Perthshire (cf. "Annals," 1904, p. 249).

Hemogamasus hirsutus, Berl. ?—Three Gamasids from the Field-mouse of St. Kilda are so very like *H. hirsutus* of moles' nests that they must be either the same species or a very closely allied one.

Ixodes borealis, Kram. and Neum.—The most interesting creature in the collection is a tick, of which there are several adult females, and a few nymphs. Mr. Waterston informs me that some of these were taken from Puffins and Fulmars caught by himself on the cliffs. They also occurred on the stones and loose turf where these are frequented by the birds—a fact well known to the natives, who dread the bite exceedingly. Curiously enough, though he often got ticks on his clothing when climbing about the rocks, he was never once bitten. These ticks, he adds, “swollen almost beyond recognition,” are found on the young Fulmars attached to the bare skin at the angles of the mouth, below the bill, and in the corners of the eyes. They there penetrate so deeply into the soft young tissue that it is difficult to dislodge them.

The accompanying figure is from one of the less distended



Ad. ♀, × 12.

of the St. Kilda specimens. Colour dark reddish-brown, inclining to yellowish in middle of shield (richer or duller according as the specimen is in spirit or dry); legs, palps, etc., pale yellow, more or less tinged with green; body, except shield, clothed with short whitish hairs; hypostome of rostrum with two rows of teeth on each side; length including rostrum $3\frac{1}{2}$ mm. The length of the largest example is fully 6 mm. The nymphs are rounder, nearly glabrous, and about 3 mm. in length.

On consulting Prof. G. Neumann's "Revision de la famille des Ixodidés,"¹ I came to the conclusion that the specimens before me were referable to the species designated by him *Ixodes putus* (Cambr.), and of which he makes *Ixodes borealis*, K. and N., a synonym. *Hyalomma puta* was described by Pickard-Cambridge in

¹ Mémoires de la Société Zoologique de France, 1896-1901.

1876, from specimens found on a Penguin at Kerguelen by the Transit of Venus Expedition; *Ixodes borealis* by Kramer and Neumann in 1883, from specimens brought from Behring Island by the Vega Expedition. Turning to the original descriptions published in the Reports on the collections made by these expeditions, I was not satisfied that they related to one and the same species. The adult St. Kilda specimens were apparently of the same species as those from Behring Island, but that they were the same as the Kerguelen ones was not so clear. I therefore sent one to the Rev. O. P. Cambridge for comparison with his types, and he replied that it had nothing to do with his *H. puta*. I next sent the specimen to Prof. Neumann, who writes me that it corresponds well to *Ixodes borealis*, K. and N., which he has called *Ixodes putus* (Cambr.), and has made the type of a sub-genus *Ceratixodes*. As to whether *H. puta* and *I. borealis* are or are not specifically identical, a comparison of the types would be the simplest way to decide the matter.

Under the name of *Ixodes* (*Ceratixodes*) *putus* (Cambr.), Prof. Neumann has recorded ticks¹—which he has himself seen, and considers all belong to one species—from several localities in the Tierra del Fuego group of islands (taken from Penguins and Cormorants); from Campbell Island, south of New Zealand; from the islands of St. Pierre, Miquelon, and St. Paul, off the south coast of Newfoundland; from Alaska; and lastly from the cliffs of Yorkshire (taken from Guillemots by Mr. F. Noad Clark). This is certainly a remarkable and suggestive distribution. The Penguins in the remote south, and the Guillemot and its allies in the north, live at all seasons far apart; and Prof. Neumann suggests that it was probably by the Cormorants—which as a genus are common to both the northern and the southern hemispheres²—and some other Palmipedes, also of wide distribution, that the tick has been dispersed. Should the Shearwaters be added to the list of the tick's hosts, we might readily suppose that these notorious wanderers have had something to do with its dispersal.

In 1852, Adam White gave to a tick, brought from Baffin's Bay by Dr. Sutherland, the name *Ixodes uricæ*, it being "parasitic on the Loom (*Uria troile*)."³ Though probably the same species as that now under notice, the want of a description or adequate figure in any case invalidates this name.

Prof. Newton tells me that Wolley, while climbing shoeless at Handa in June 1849, got several severe bites from ticks of large size.

¹ Résultats du Voyage du S.Y. Belgica—Zoologie; Acariens parasites, 1903. Also states here that *I. fimbriatus*, K. and N., is ♂ of this.

² He is wrong, however, in supposing that *Phalacrocorax graculus*, L.—our Shag—occurs also in Brazil and the Antarctic.

³ P. C. Sutherland's Journal of Voyage in Baffin's Bay, 1852, vol. ii., Appendix by A. White, p. ccx.

MYRIAPODA.

Two Chilopods, both common and widely-spread species, were collected, namely :—

Lithobius forficatus (Linn.), and—

Geophilus carpophagus, Leach.—A few of each. The only representative of the Diplopods is—

Iulus britannicus, Verh.—Three specimens, agreeing precisely with others I have from the coasts of East Lothian and Fife.

The following Insects are in the collection.

INSECTA.

COLLEMBOLA AND THYSANURA.

Tomocerus tridentifer (Tullb.).—A few.

Entomobrya albocincta (Templ.).—One example ; but Mr. Waterston says it was common.

E. nicoletii (Lubb.).—One.

These three Springtails are all common and generally distributed in the British Isles.

Machilis maritima (Leach).—Several. As might be expected, this Bristle-tail is abundant on St. Kilda, occurring, Mr. Waterston tells me, not only at or near high-water mark, but even in the stone walls about the village.

ORTHOPTERA.

Forficula auricularia, L.—The Earwig is common on St. Kilda, whence it has already been recorded by Mr. C. W. Dale ("Entomologist," January 1889).

MALLOPHAGA AND PSOCIDÆ.

Lipeurus staphylinoides, Denny.—A number of both sexes from the Gannet. The males are certainly this insect, and I have no doubt so also are the females, though they bear a close resemblance to Denny's figure of his *Docophorus bassanæ*. There is also an example of a quite different *Lipeurus* from a gannet—fiddle-shaped head and narrower body—which neither Denny's "Monograph" nor Giebel's "Insecta Epizoa" enables me to identify.

Clothilla pulsatoria (L.).—One specimen. I have found this little Psocid commonly in houses and other buildings in various parts of Scotland.

ANOPLURA AND COCCIDÆ.

Pediculus capitis, Nitz.—One example.

Orthezia cataphracta (Shaw).—One. Common throughout Scotland, and already recorded from St. Kilda in Newstead's

"Monograph of the Coccidæ." Newstead also records *Orthezia* (*Newsteadia*) *floccosa*, De G., from the island.

SIPHONAPTERA.

Pulex irritans, L.—One example.

HYMENOPTERA.

Myrmica rubra (L.)—There are a number of specimens, all referable to the race *uginodis*, Nyl., of this abundant and generally distributed Ant.

Pezomachus, Sp.—A single specimen of a very small apterous Ichneumonid belongs to this genus.

Note.—Since this paper left my hands I have submitted the *Pezomachus* to Mr. Claude Morley, and he tells me it is *P. festinans*, Grav., var. *posthumus*, Först. I also hear that in "Journ. Agric. Science" for March, Mr. E. G. Wheler records *Ceratixodes putus* (Cambr.) from the Farne Islands.

SOME ROTIFERA OF THE FORTH AREA, WITH DESCRIPTION OF A NEW SPECIES.

By JAMES MURRAY.

WHILE compiling a list of Bdelloid Rotifera which recently appeared ("Proc. Roy. Phys. Soc. Edin.," xvi. 215), quantities of moss from all kinds of situations were continually sent to me by Mr. Wm. Evans. An occasional sample of pond material was also sent. This "moss" was examined primarily for Bdelloids and Water-bears, but incidentally I noted any other microscopic animals which I recognised. This short list of non-bdelloid Rotifers thus observed, only some thirty-four in all, would hardly have called for publication, and might have waited till a more extensive list could be prepared, but a few very rare (or reputedly rare) and interesting species were among those found, and a hitherto undescribed *Stephanops*, and on account of these the list is now published.

Of the thirty-four species here recorded fifteen are included in Scott and Lindsay's list of Rotifera from the Upper Elf Loch (7). For these we give additional localities.

Most of the others are common and widely distributed species, which call for no remark.

Like the previous list of Bdelloida (6) this list of non-bdelloid Rotifera is entirely founded on Mr. Evans's collections.

References to the short list of works cited at the end of this paper are made in the text by figures in thick type enclosed in parentheses.

LIST OF SPECIES.

RHIZOTA.

Family FLOSCULARIADÆ.

Floscularia ambigua, Huds.—Upper Elf Loch, Braid Hills, November 1905.

Family MELICERTADÆ.

Æcistes crystallinus, Ehr.—Bavelaw Moss, February 1905.

PLOIMA.

Family HYDATINADÆ.

Notops hyptopus, Ehr.—Hopetoun Woods, December, 1905.

Family NOTOMMATADÆ.

Notommata aurita, Ehr.—Near Doune, Upper Elf Loch, Winchburgh.

Furcularia longiseta, Ehr.—Bavelaw Moss.

F. reinhardti, Ehr.—Torduff and Nether Habbie's Howe (Pentland Hills), Winchburgh. The species, or the closely related *Notommata theodora*, Gosse, if the two are not identical, is frequent in the open water of lochs. Except in the matter of size, which is variable in the species, I can see no difference between the lacustrine form and that which Mr. Evans got in moss from the three localities mentioned above.

F. forficula, Ehr. (2).—Near Doune, Upper Elf Loch.

Diglena forcipata, Ehr.—Upper Elf Loch; Pond near Winchburgh, December 1905; Marl-pit at Davidson's Mains, February 1906.

D. dromius, Glascott.—This very large member of the genus was identified by Mr. Rousselet from a drawing sent to him. Malleny Dam, near Balerno, February 1905.

D. rosa, Gosse (3) (? = *Taphrocampa saundersiæ*, Gosse).—An anomalous animal, combining the characters of two sufficiently remote genera. Marl-pit at Davidson's Mains, near Edinburgh, February 1906.

Proales wernecki, Ehr.—Ditch near Bavelaw Castle, March 1906. A remarkable parasite making galls on *Vaucheria*.

Family DINOCHARIDÆ.

Dinocharis tetractis, Ehr.—Bavelaw Moss.

Stephanops stylatus, Milne (4).—Bavelaw Moss, Duddingston Loch, Hopetoun Woods, Cocklerue near Linlithgow.

S. tenellus, Bryce (1).—Discovered by Bryce in Moss from Spitzbergen in 1897, the animal has been rarely noticed since; indeed, it is so small and moves so fast, that if only seen under low powers it would be readily passed over as a Ciliate Infusorian. I have seen it several times in Scotland, but never in abundance till Mr. Evans got it in Hopetoun Woods, December 1905.

S. microdactylus, n.sp.—Very small, lorica narrow, bearing towards its posterior edge a long rigid curved seta; foot long, very slender, without spines, of three nearly equal segments; terminating in two excessively minute toes.

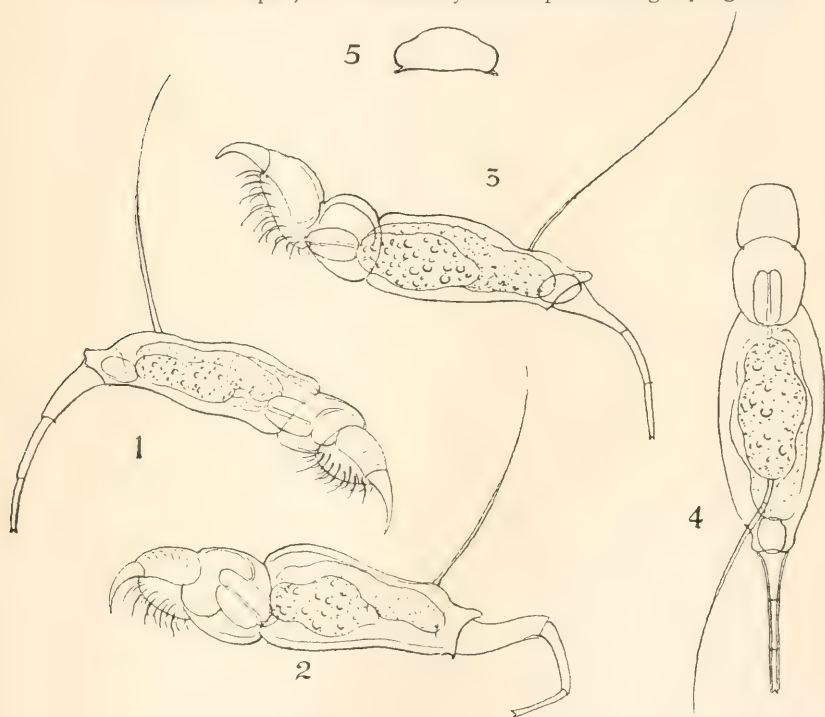
Its total length of $\frac{1}{2}\frac{1}{50}$ inch (100μ) shows it to be one of the smallest rotifers known, being just a little less than *S. tenellus*, which measured $\frac{1}{2}\frac{1}{36}$ inch (106μ). Bryce, it is true (1), gives his species as only 80μ or $\frac{1}{3}\frac{1}{10}$ inch, but Scotch examples are larger. The toes are so small that under a magnification of 500 diameters they are scarcely perceptible. The rigidity of the spine is seen when the animal turns under the cover-slip, when the spine becomes strongly curved, but its angle to the lorica does not change. The hood is like that of *S. tenellus*, but the mouth has not the very long setæ of that species and *S. stylatus*. No eyes were seen.

In habits it is very different from *S. tenellus*. Though it sometimes runs pretty fast, it does not make the little automatic rushes characteristic of *S. tenellus*, which appears to be wound up to go only in a certain way. This travels about more intelligently, varying its rate and manner of moving according to circumstances, stopping to examine a promising corner, or quietly resting in one spot for a long time, leisurely grubbing with its pick among the debris, like a *Metopidia*, rolling from side to side on the point of its toes like a *Colurus*.

Many species of *Stephanops* having a long median spine have been described. From all of these the present species is distinguished by the posterior position of the spine, which is not articulated at the base, and by the slender foot with minute toes. It is also a much smaller animal. According to Weber (9) who sorted out the confused synonymy, and who unites most of the dorsal-spined *Stephanops* under *S. longispinatum*, Tatem (8), that species is about half as long again (140 to 160μ).

Habitat—among Sphagnum—Blantyre Moor, near Glasgow, 1901-2; Aberfoyle (Evans), December 1905.

Though I discovered this species four years ago, in the confusion that existed among the long-spined *Stephanops*, I could not venture to describe it till its rediscovery by Mr. Evans enabled me to confirm my previous observations. The Blantyre Moor specimens had the spine simply curved forwards from base to apex, that of Aberfoyle example was slightly sigmoid.



STEPHANOPS MICRODACTYLUS, n.sp.

Figs. 1 and 2.—Example from Blantyre Moor in two characteristic attitudes.

Fig. 3.—Example from Aberfoyle, in the common position when running forward.

Fig. 4.—Dorsal view.

Fig. 5.—Optical transverse section through the middle of the trunk.

Family SALPINADÆ.

Diaschiza gibba, Ehr. (= *D. semiaperta*, Gosse).—Malleny Dam.

D. tenuior, Gosse.—Upper Elf Loch, and near Winchburgh.

D. sterea, Gosse.—Upper Elf Loch, and near Winchburgh.

D. exigua, Gosse.—Hopetoun Woods.

D. gracilis, Ehr.—Near Roslin, March 1905.

Salpina mucronata, Ehr.—Upper Elf Loch, Marl-pit at Davidson's Mains, Winchburgh.

Family CATHYPNADÆ.

Cathypna rusticola, Gosse.—Bavelaw Moss, Leadburn, Hopetoun Woods.

Distyla flexilis, Gosse.—Bavelaw Moss, Upper Elf Loch.

Family COLURIDÆ.

Colurus obtusus, Gosse.—Duddingston Loch, Torduff, Nether Habbie's Howe.

C. leptus, Gosse.—Upper Elf Loch, Nether Habbie's Howe.

Metopidia lepadella, Ehr.—Malleney Dam, Duddingston Loch.

M. solidus, Gosse.—Upper Elf Loch, Winchburgh.

M. acuminata, Ehr.—Rosebery, Lothian Burn.

M. rhomboides, Gosse.—Leadburn, and near Doune.

Family PTERODINADÆ.

Pterodina patina, Ehr.—Pond near Winchburgh, December.

P. elliptica, Ehr.—Pond near Winchburgh.

Family BRACHIONIDÆ.

Brachionus urceolaris, Ehr.—Pond near Winchburgh.

Family ANURÆADÆ.

Anuræa aculeata, Ehr.—Nether Habbie's Howe.

Var. *valga*.—Nether Habbie's Howe.

Notholca foliacea, Ehr.—Near Doune.

NOTE.

ADDITION TO THE LIST OF FORTH BDELLOIDS,
referred to on p. 88.

Rotifer neptunius, Milne (4) (5).—Marl-pit at Davidson's Mains, February 1906 (Evans).

LITERATURE.

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- (7) SCOTT AND LINDSAY, 'Micro-flora and Micro-fauna of the Upper Elf Loch, Braids,' "Trans. Edin. Field Nat. and Micros. Soc.," vol. iii., 1897-8, pp. 381-383.
- (8) TATEM, T. G., 'New Species of Microscopic Animals,' "Quart. Journ. Micr. Sci.," N.S., vol. vii., 1867, p. 252.
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ADDITIONS AND CORRECTIONS TO THE TOPOGRAPHICAL BOTANY OF SCOTLAND.

By JAMES W. H. TRAIL, A.M., M.D., F.R.S., F.L.S.

(*Continued from p. 48.*)

HIERACIUM, *L.*

In the "Annals of Scottish Natural History," 1902, pp. 244-250, I gave an enumeration of the *Hieracia*, following the "London Catalogue," ed. 9, with a statement of the distribution, compiled from "Topographical Botany," ed. 2, and from the later records of those who had devoted special study to the group. Since that paper was issued there have appeared three important works dealing with these plants, viz., in November 1902 and November 1903, 'A Revision of the British Hieracia' in Mr. F. N. Williams's "Prodrömus Floræ Britannicæ"; in 1904 the ninth edition of Babington's well-known "Manual of British Botany," edited by Messrs. H. and J. Groves, in which is an "entirely new account of the genus, drawn up under the direction of Mr. F. J. Hanbury, from his notes and specimens, by Miss R. F. Thomson"; and in 1905 "The British Hieracia," by Rev. W. R. Linton, who has made use of Mr. Williams's "Revision," and "has received most valuable help from Mr. F. J. Hanbury, Revs. A. Ley, E. F. Linton, and E. S. Marshall, and from Mr. Chas. Bailey for specimens lent."

Of these monographs the first often differs markedly from the conclusions embodied in the "London Catalogue" as to the groupings and extent of the "species." The second is almost identical in classification with the "London Catalogue" except in a few details. The third differs less from the "London Catalogue" than

does the "Revision," yet shows a considerable diversity in its grouping of the forms, and also in the extent of the "species" and "varieties." Only an expert may venture to express personal views on such a genus, hence the subjoined list follows "The British Hieracia," as its author has had the advantage in its preparation of considering the conclusions expressed in the other works named, as well as extensive acquaintance with the genus in both nature and herbaria, and much aid from experts in the study of the genus.

HIERACIUM, L.

Subgenus PILOSELLA, Rupp.

H. Pilosella, L. *Except 112.*

var. concinnum, F. J. Hanb., 90, 92.

var. nigrescens, Fr., 90, 107.

f. atrichidium, Williams, 88.

var. Pseudopilosella, Ten., 90.

H. *aurantiacum*, L. A frequent outcast or escape, 72, 77, 79, 83, 86-88, 92, 93, 95, 98, 99.

H. *pratense*, Tausch., 79, 82, 83, 95. May be native.

Subgenus ARCHIERACIUM, Fr.

1. *Cerinthoidea*, Koch.

H. *anglicum*, Fr., *aggr.*, 72, 81 (?), 83 (?), 85-90, 91 (?), 92-94, 96-99, 103-106, 108-111.

var. acutifolium, Backh., 88, 90, 92, 96, 104, 108.

var. cerinthiforme, Backh., 88-90, 92, 97, 98, 99 (?), 109-111.

var. longibracteatum, F. J. Hanb., 88-90, 93, 94, 97, 98, 104, 105, 108-110.

H. *langwellense*, F. J. Hanb., 72, 89, 97, 98, 106, 107, 109. (Williams unites this with *H. anglicum*.)

H. *flocculosum*, Backh., 77, 88-90, 92, 96 (?), 97, 98, 108, 112.

H. *iricum*, Fr., 72, 88-90, 92, 98, 104, 105, 108-111.

2. *Alpina*, Fr.

H. *alpinum*, L., given in "Top. Bot." for 88, 90, 92, 96-99, 104, 105, 108; and as *H. melanocephalum* from 94 in addition.

var. insigne, Bab., 92.

H. *holosericeum*, Backh., 72, 73, 87-90, 92, 94, 96-98, 105, 106, 118.

H. *eximium*, Backh., 88-90, 92, 94, 96-98, 105, 106 (?), 107 (?), 108.

var. tenellum, Backh., 88, 92, 94, 96, 97 (?), 98, 105.

H. *calenduliflorum*, Backh., 88-90, 92, 97, 98.

- H. gracilentum*, *Backh.*, 88-90, 92, 94, 96-98, 105.
var. graniticolum, *W. H. Linton*, 90, 92, 94, 96, 105.
- H. petiolatum*, *Elfstr.*, 92, 94, 96.
- H. globosum*, *Backh.*, 89, 92, 94, 96, 97 (?), 105 (?), 106, 107, 108.
- H. curvatum*, *Elfstr.*, 88, 90, 92, 94, 97, 98, 108, "embraces much of what British botanists have hitherto placed under *H. nigrescens*."
- H. Backhousei*, *F. J. Hanb.*, 88, 92, 94, 96-98, 106.
- H. lingulatum*, *Backh.*, 86-90, 92, 94, 96-99, 105, 108.
- H. senescens*, *Backh.*, 85, 87, 88, 90, 92, 94, 96-99, 105.
- H. Marshalli*, *Linton*, 88, 90, 92, 98, 108.
- H. chrysanthum*, *Backh.*, 88-90, 92, 94, 96, 97, 105, 108.
var. microcephalum, *Backh.*, 88, 90, 92, 97, 106.
- H. sinuans*, *F. J. Hanb.*, 87, 88, 90, 98, 110.
- H. nigrescens*, *Willd. Aggr.*, 88, 92, 98; also recorded for 85, 89, 90, 94, 96, 97, 105, 108, but often confounded with other allied forms. *Linton* says of it, "Breadalbane, type rare."
var. commutatum, *Lindeb.*, 92. (Williams holds it "not distinct.")
var. gracilifolium, *F. J. Hanb.*, 87, 88, 97, "the more frequent form."
- H. atratum*, *Fr., f. gymnopetala*, *W. R. Linton*, 87, 88, 92, 97, 98, 105, 106.
- H. submurorum*, *Lindeb.*, 88, 90, 97, 98.
- H. centripetale*, *F. J. Hanb.*, 72, 86, 88, 92, 96, 97, 100.
- H. hyparcticum*, *Elfstr.*, 108.

3. *Amplexicaulia*.

H. amplexicaule, *L.*, 89

4. *Oreadea*, *Fr.*

- H. Leyi*, *F. J. Hanb.*, 88-90, 92, 105, 109. Williams refers this to *H. anglicum*.
- H. Schmidtii*, *Tausch.*, 72, 80, 81, 83, 86-94, 96, 97 (?), 98, 99, 100 (?), 104-111.
var. crinigerum, *Fr.*, 91, 92 (?), 96, 97 (?), 110, 112.
- H. lasiophyllum*, *Koch.*, 89, 90, 110, 112.
var. euryodon, *F. J. Hanb.*, 72, 88-90, 92.
- H. rubicundum*, *F. J. Hanb.*, 72, 86 (?), 88, 90, 92, 99, 105, 108, 109, 110 (?), 111.
var. Boswelli, *Linton*, 88, 104, 105, 108-112.
- H. caledonicum*, *F. J. Hanb.*, 85, 92, 104, 106-111.
- H. nitidum*, *Backh.*, 72, 90, 92, 96, 97, 107, 108.
- H. Carenorum*, *F. J. Hanb.*, 108. Referred by Williams to *H. anglicum*.
- H. argenteum*, *Fr.*, 72, 87-92, 96-98, 105, 108-110.
var. septentrionale, *F. J. Hanb.*, 108.

- H. Sommerfeltii*, *Lindeb.*, 72, 88-90, 92, 94, 97 (98, 99, "Gl. Cat."), 104, 105, 108, 109.
var. tactum, *F. J. Hanb.*, 97, 98.
H. Oreades, *Fr.*, *var. subglabratum*, *F. J. Hanb.*, 90, 108-110, 112 (?).
var. brachymorphum, *W. R. Linton*, 90.
H. pseudonosmoides, *Dahlst.*, 72, 79, 88, 89, 92, 95, 99.
H. orimeles, *W. R. Linton*, 98, 112.
H. buglossoides, *Arv. Tourv.*, 72, 79, 88, 89, 92, 99, 104, 106, 107, 112 (?).
H. scoticum, *F. J. Hanb.*, 88, 90, 97, 104, 108, 110.
H. proximum, *F. J. Hanb.*, 108, 109.

5. *Vulgata.*

- H. callistophyllum*, *F. J. Hanb.*, 72, 88, 90, 92, 97, 98.
var. cremnanthes, *F. J. Hanb.*, Glen Falloch, 88, 90, 92, 97, 98.
var. glandulosum, *F. J. Hanb.*, 88, 97, 98.
H. clovense, *Linton*, 72, 89, 90, 92.
H. stenolepis, *Lindeb.*, 72, 92 (99 "Gl. Cat."), 104, 108, 110.
var. anguinum, *W. R. Linton*, 72, 108.
H. silvaticum, *Gouan*, *aggr.* All except 73, 103.
var. cordigerum, *Norr.*, 110.
var. asymmetricum, *Leys*, Sutherland.
var. prolixum, *Dahlst.*, 92.
var. micracladium, *Dahlst.*, 72, 75, 83, 86, 88, 90, 92 (97 "Gl. Cat."), 108.
var. subtenue, *W. R. Linton*, 90, 98, 104, 108.
var. phacotrichum, *Dahlst.*, 109 (Druce).
H. aggregatum, *Backh.*, 87 (?), 88, 90, 92, 96, 97.
H. oxyodus, *W. R. Linton*, 72, 88. (= *H. aggregatum*, *var. prolongatum*, *F. J. H.*).
var. delicatulum, *W. R. Linton*, 88.
H. candelabræ, *W. R. Linton*, 108.
H. variicolor, *Dahlst.*, 88-90, 92.
H. ciliatum, *Almq.*, 72 (86 "Gl. Cat."), 88, 90, 97-99, 105, 108.
H. serratifrons, *Almq.*, *var. lepidoides*, *K. Johans.*, 88, 89.
var. crassiceps, *Dahlst.*, 88, 90.
var. caliginosum, *Dahlst.*, 88, 108.
var. morulum, *Dahlst.*, 108.
H. Pictorum, *Linton*, 87, 88, 90, 92, 97, 98.
H. subulatidens, *Dahlst.*, 90.
H. crebridens, *Dahlst.*, 88, 92, 108.
H. pollinarium, *F. J. Hanb.*, 108.
H. breadalbanense, *F. J. Hanb.*, 88. Regarded by Williams as a variety of *H. Pictorum*.

- H. rivale*, *F. J. Hanb.*, 72, 87-90, 92, 97 (98, 100, "Gl. Cat."), 104, 107, 108, 110.
var. dasythrix, *Linton* (86, "Gl. Cat."), Glen Falloch, 88, 97, 98.
- H. petrocharis*, *Linton*, 88.
- H. sagittatum*, *Lindeb.*, 88, 89.
var. subhirtum, *F. J. Hanb.*, 72, 87-89, 97, 98, 110.
var. philanthrax, *Dahlst.*, 88.
- H. sarcophyllum*, *Stenstr.*, 72, 88, 90, 97, 108.
var. expallidiforme, *Dahlst.*, 88-90, 109, 111.
- H. rotundatum*, *Kit.*, 90.
- H. prætenerum*, *Almq.*, Sutherland.
- H. euprepes*, *F. J. Hanb.*, 72, 87-90, 92, 97, 98, 110.
var. glabratum, *Linton*, 87-90, 92, 98.
var. clivicolum, *F. J. Hanb.*, 109 (?), 109 (?).
var. pruiniferum, *W. R. Linton*, 88, 90.
- H. caesium*, *Fr.*, 72 (75 and 77, "Gl. Cat."), 88-90, 92, 94, 96, 97, 104, 105 (?), 108, 111 (?).
var. insulare, *F. J. Hanb.*, 88, 90, 97, 104.
var. alpestre, *Lindeb.*, 88-90, 92, 97, 98, 108, 109.
- H. farrense*, *F. J. Hanb.*, 88-90, 92, 108.
- H. eustales*, *Linton*, 88, 89, 92.
- H. caesiomurorum*, *Lindeb.*, 88, 89, 92, 96, 98, 108.
- H. duplicatum*, *Almq.*, 88.
var. stenophyes, *W. R. Linton*, 72, 88 (?), 97 (?), 98 (?), 108.
- H. anfractiforme*, *E. S. Marshall*, 88, 97, 98, 109.
- H. dissimile*, *Lindeb.*, 88, 98, 108.
- H. duriceps*, *F. J. Hanb.* Has been recorded from 72 (86, "Gl. Cat."), 87, 88, 98, 104, 105 (?), 107, 108, 112. In *Linton's* "Brit. Hier." only 98, Sutherland, and 112 are given.
var. cravoniense, *F. J. Hanb.*, 72, 89, 108.
- H. vulgatum*, *Fr. Aggr.* Probably in every vice-county, but records inaccurate.
var. normale. The usual form.
var. sejunctum, *W. R. Linton*, 97-101.
var. subfasciculare, *W. R. Linton*, 109.
var. subravusculum, *W. R. Linton*, 100, 108.
- H. orcadense*, *W. R. Linton*, 111.
- H. Orarium*, *Lindeb.*, 89, 92 (99, "Gl. Cat."), 108-111.
- H. subramosum*, *Lönnr.*, 85.
- H. angustatum*, *Lindeb.*
var. elatum, *Lindeb.*, 72, 88, 90, 92, 98, 108.
- H. Adlerzii*, *Almq.*, 90 (?).
- H. diaphanoides*, *Lindeb.*
var. apiculatum, *Linton*, 90.
- H. diaphanum*, *Fr.*, 88, 89.

6. *Alpestria*, Fr.

- H. dovrense*, *Fr.*, 97, 106 (?), 108, 112.
var. Hethlandiæ, *F. J. Hanb.*, 112.
H. zetlandicum, *Beeby*, 112. Referred by Dahlstedt to *H. dovrense*.
H. Dewari, *Syme* (86, "Gl. Cat."), 87, 88, 89, 96-99.
H. demissum, *Stromf.*, *var. pulchelliforme*, *W. R. Linton*, 112.
H. protractum, *Lindeb.*, 112.
H. truncatum, *Lindeb.*, 87, 96, 97, 112. "Brit. Hier." gives this only for 112.
H. perthense, *Williams* (= *H. dovrense*, *var. spectabile*, E. S. Marshall), 88-90.

7. *Rigida*, Lindeb.

- H. gothicum*, *Fr.*, 72 (?), 74, 77 (?), 85 (?), 86 (?), 87 (?), 88-90, 92, 96, 104, 108, 109, 112.
f. latifolia, 88, 90, 92, 104, 108, 109.
H. stictophyllum, *Dahlst.* (= *H. sparsifolium*, bot. angl.), 72 (?), 73 (?), 86 (?), 88, 97, 98 (99 and 102, "Gl. Cat."), 104, 105, 107, 110.
H. sparsifolium, *Lindeb.* (*non* bot. angl.), 97.
var. longiciliatum, *F. J. Hanb.*, 92.
H. tridentatum, *Fr.*, pp. Recorded for 72, 87, 88, but type not given for Scotland by Linton.
var. acrifolium, *Dahlst.*, 88, 90.
H. rigidum, *Hartm.* (86, "Gl. Cat."), 93 (?).
var. Friesii, *Dahlst.* (86, "Gl. Cat."), 109 (?), 112.
var. trichocaulon, *Dahlst.*, 92.
var. obatrescens, *Dahlst.*, 92.
var. lineatum, *Dahlst.*, 104.

8. *Prenanthoidea*, Fr.

- H. prenanthoides*, *Vill.*, 72, 86-90, 92, 95, 105, 108. Also recorded for 77, 79, 81, 83, 84, 85, 91, 93, 96, 104, 109, but requiring confirmation.
H. strictum, *Fr.* Linton gives this for 72, Perth, 92, 95, 97, 99, 104, 108, 109, 112. It is also on record for (75 and 77, "Gl. Cat."), 85, 90, 96, 102, 106, 107, 110, 111.
var. opsianthum, *Dahlst.*, 87-89, 92, 96, 97, 106, 108, 109.
var. reticulatum (*Lindeb.*), 72, 73, 88, 92, 96, 98, 105, 106, 108-110.
var. amplidentatum, *F. J. Hanb.*, 85, 88, 89, 96-98, 111.
var. angustum (*Lindeb.*), 88, 89, 92, 95-97, 112.
var. subcrocatum, *Linton*, 72, 75, 79, 97, 104.

9. *Foliosa*, Fr.

H. corymbosum, Fr., 77 (?), 80 (?), 87-93, 96, 97, 103-106, 108, 109, 111.

var. salicifolium, Lindeb. Recorded for 87 and 89, but not noticed by Linton in "Brit. Hier."

var. melanoglochin, W. R. Linton, 108.

var. umbellatiforme, W. R. Linton. Linn of Campsie in 88 or 89.

H. auratum, Fr., 72 (77 and 86, "Gl. Cat."), 87-89, 92, 96-98 (99, "Gl. Cat."), 104-109, 111.

var. thulense, F. J. Hanb., 112. Regarded by Dahlstedt as a form of next.

H. crocatum, Fr., 72, 73 (74 and 86, "Gl. Cat."), 79, 80, 87-92, 96-98, 103-105, 109 (110, "Gl. Cat.).

var. pycnophyllum, Lindeb., 88.

var. trichophyton, Almq., 88.

H. maritimum, F. J. Hanb., 108.

H. boreale, Fr. Recorded from all *except* 78, 82, 86, 89, 92, 96, 103, 105, 107-112, but the records require revision.

var. Hervieri, "Arv. Jouv.," 73.

10. *Umbellata*.

H. umbellatum, L., 72-75, 80, 86, 88, 90, 96, 98. Also recorded from 77, 81, 83, 91, 100, 101, 102, 108, 109, but requiring confirmation.

var. pauciflorum, Hartm., 98, 108.

var. linariifolium, Wallr., 72, 88.

Hypochæris glabra, L., 92.

Leontodon hirtus, L., 77 conf., 85, 89 (?), 98 ("Gl. Cat.).

L. hispidus, L., 84, 97, and 101 ("Gl. Cat.).

L. autumnalis, L. All vice-counties.

var. sordidus, Bab. Frequent, though recorded from few vice-counties, 91-97, 107, 110.

Taraxacum officinale, Weber, *var. erythrospermum* (Andrz.).

Probably wide spread, though not often expressly noted; 91, 93, 95, 97.

var. palustre (DC.), 84, 95, 101, 102, and 103 ("Gl. Cat."), 105, 107.

var. udum (Jord.). Has been recorded from 88, 90, 92, 108.

Lactuca muralis, Fresen., 75, 84, 89, 91† (?), 93†, 99, and 101 ("Gl. Cat.).

Sonchus oleraceus, L. This varies greatly, showing the forms distinguished by Wallroth as *integrifolius*, *triangularis*, and *lacerus*, being also sometimes glandular, sometimes nearly glabrous.

S. asper, *Hoffm.* In all. Also a very variable species.

S. arvensis, *L.*, *var. glabrescens*, *Hall.* Not common. 88, 92, 108.

Tragopogon pratense, *L.*, 84.

T. porrifolius, *L.* A casual only, 77, 83.

(*To be continued.*)

ALIEN PLANTS NEAR EDINBURGH.

By JAMES FRASER.

DURING 1905 the following "introduced" or "alien" plants were observed in this neighbourhood by Mr. James M'Andrew and myself. A few names which already appeared in my former lists ("Annals Scot. Nat. Hist." for April 1904 and April 1905) are here repeated, where confirmation was required or for other reasons.

For the sake of brevity the district of "Slateford" is again represented by the number 1, and "Leith Docks" by 5, while the abundance of each species in these and the other districts mentioned by name is, as in previous lists, expressed thus: α = once found; β = twice or thrice, but rare; γ = neither rare nor frequent; δ = frequent; ϵ = abundant.

In several cases it is obvious how the plants reached their present habitats. For example, most of those found in Craigmillar Quarry and on the banks of railways which were cut through, or pass among, gardens and nurseries, as at Warriston and Trinity, are beyond doubt garden survivals or outcasts; to these are added the letters (ouc.): then plants found in private grounds and policies and in the district named "Near Kirkliston," by their nature and number clearly indicate that they were planted; to such are added the letters (pl.).

Striking features of the Slateford district this year were the presence of *Triticum ovatum*, Gren. and Godr., with five beards on the lower glume where there are usually four, *Poa bulbosa*, *L.* in large numbers and all viviparous, and two varieties of *Suaeda*. Slateford is about five miles from the sea.

Features of the Leith Docks district were the presence of a few scores of *Lepturus incurvatus*, Trin., and of *Phalaris cærulescens*, Desf., and much *Poa bulbosa*, L., none of which was viviparous.

At Gorgie Railway Station *Triticum cylindricum*, Ces. was very plentiful.

RANUNCULACEÆ.

Aconitum Napellus, L. Borthwick Glen, δ (ouc.).

Adonis æstivalis, L. 5, δ.

Aquilegia vulgaris, L. Near Dalmeny, β (pl.).

Delphinium Consolida, L. 5, β.

D. divaricatum, Ledeb. 5, α.

PAPAVERACEÆ.

Argemone mexicana, L. 1, 5, β.

Hypecoum grandiflorum, Benth. 5, α.

H. pendulum, L. 1, β; 5, γ.

Meconopsis cambrica, Vig. Near Kirkliston; Hopetoun, δ (pl.).

Papaver hybridum, L. 1, β.

P. nudicaule, L. 5, α.

FUMARIACEÆ.

Fumaria parviflora, Lam. 5, β.

CRUCIFERÆ.

Alyssum maritimum, Lam. 5, β.

Brassica sabularia, Brot. 1, δ.

Barbarea intermedia, Bor. 5, α.

Camelina sylvestris, Wallr. 5, δ.

Chorispura syriaca, Boiss. 1, α.

C. tenella, DC. 1, α.

Draba muralis, L. Trinity, ε.

Sisymbrium orientale, L. forma grandiflora. 1, β

S. Loeselii, L. 1, β.

S. officinale, Scop., var. leiocarpum, DC. 5, ε : South Queensferry, γ.

RESEDACEÆ.

Reseda crispata, Link. Burntisland, α.

CARYOPHYLLÆ.

Dianthus barbatus, L. Craigmillar Quarry, β (ouc.).

Sagina Reuteri, Boiss. Murrayfield, ε.

Silene juvenalis, Del. 5, α.

MALVACEÆ.

- Althæa hirsuta*, *L.* 1, δ . *M. sylvestris*, *L.*, *var. lasiocarpa*,
A. rosea, *Cav.* 5, α . Druce. 1, β .
Malva ægyptia, *L.* 1, 5, γ . *M. nicæensis*, *All.* 5, β .

LINEÆ.

- Linum grandiflorum*, *Desf.* 5, β . *L. perenne*, *L.* 5, β .

GERANIACEÆ.

- Erodium maritimum*, *L'Herit.* 5, α . ?
Geranium phæum, *L.* Craigmillar Quarry, γ ; near Slateford, β .
Impatiens Roylei, *Walp.* Slateford Village, γ (ouc.).

TROPÆOLACEÆ.

- Tropæolum majus*, *L.* Near Slateford, β (ouc.).

SAPINDACEÆ.

- Acer campestre*, *L.* South Queensferry; Gorebridge, γ (pl.).

LEGUMINOSÆ.

- Astragalus boeticus*, *L.* 1, 5, β . *M. elegans*, *Willd.* 5, β .
Cicer arietinum, *L.* 1, 5, γ . *M. littoralis*, *Rhode.* 1, 5, β .
Coronilla varia, *L.* Near Kirk- *M. minima*, *L.* 5, α .
 liston, δ (pl.). *Trifolium agrarium*, *L.* 5, β .
Hedysarum coronarium, *L.* 1, β .* *T. clypeatum*, *L.* 5, β .
Hippocrepis unisiliquosa, *L.* *T. Cherleri*, *L.* 5, α .
 Gorgie, 5, β . *T. pannonicum*, *Jacq.* 1, 5, β .
H. multisiliquosa, *L.* 5, α . *Trigonella azurea*, *C.A. Mey.* 5, β .
Lotus Tetragonolobus, *L.* 5, α ; *T. hamosa*, *L.* 1, α .
 Gorgie, β . *T. laciniata* *L.* 5, α .
L. ornithopodioides, *L.* 1, 5, β . *Vicia Ervilia*, *Willd.* Gorgie, β ;
Lupinus albus, *L.* 1, β . 1, 5, γ ; Burntisland, β .
Medicago ciliaris, *Willd.* 1, 5, α . *V. tenuifolia*, *Roth.* Inveresk, β .

ROSACEÆ.

- Alchemilla conjuncta*, *Bab.* Craigmillar Quarry, β (ouc.).

SAXIFRAGACEÆ.

- Astilbe japonica*, *A. Gray.* Craigmillar Quarry, β (ouc.).
Saxifraga Geum, *L.* Auchendinny; Carlowrie, ϵ .
S. umbrosa, *L.* Auchendinny, ϵ ; Trinity, ϵ (ouc.).
Sedum spurium, *M. Bieb.* Craigmillar Quarry, β ; Trinity, γ (ouc.).
S. Telephium, *L.* Burntisland, β (ouc.).

LOASACEÆ.

Mentzelia albicaulis, *Dougl.* Burntisland, α .

UMBELLIFERÆ.

<i>Ammi majus</i> , <i>L.</i>	1, γ .	<i>Caucalis leptophylla</i> , <i>L.</i>	1, 5, γ .
<i>A. Visnaga</i> , <i>Lam.</i>	1, β .	<i>Scandix iberica</i> , <i>Bieb.</i>	Burnt-
<i>Capnophyllum dichotomum</i> ,		island, α ;	1, 5, γ .
<i>Lag.</i>	1, α .	<i>S. pinnatifida</i> , <i>Vent.</i>	1, 5, β .
<i>Bifora radians</i> , <i>Bieb.</i>	1, α .		

DIPSACEÆ.

Dipsacus sylvestris, *Mill.* Near Slateford, δ ; Port Seton, β .

COMPOSITÆ.

Achillea Santolina, *L.* Craigmillar Quarry, β (ouc.).
Artemisia Abrotanum, *L.* Craigmillar Quarry, β (ouc.).
A. maritima, *L.* 5, β .
Centaurea calcitrapoides, *L.* 5, α .
C. montana, *L.* Craigmillar Quarry, β (ouc.).
C. pallescens, *Del.*, var. *hyalolepis*, *Boiss.* 5, β .
C. salmantica, *L.* 1, β .
Chrysanthemum macrophyllum, *Waldst. and Kit.* Near Kirkliston,
 δ (pl.).
Cnicus rivularis, *Willd.* Craigmillar Quarry, α (ouc.).
C. syriacus, *Roth.* Gorgie, γ ; 5, β .
Doronicum plantagineum, *L.* Near Kirkliston, ϵ (pl.).
Odontospermum aquaticum, *Sch. Bip.* 5, α .
Petasites albus, *Gærtn.* Near Kirkliston, ϵ (pl.).
Xanthium spinosum, *L.* 1, α .

CAMPANULACEÆ.

Campanula rapunculoides, *L.* 5, α (ouc.).

HYDROPHYLLACEÆ.

Phacelia tanacetifolia, *Benth.* 5, α .

BORAGINEÆ.

Cerinthe aspera, *Roth.*, weed in garden, Warriston, α .
Echinospermum minimum, *Lehm.* 1, α .
Lithospermum purpureo-cœruleum, *L.* Near Kirkliston, γ (pl.).
Omphalodes linifolia, *Mærch.* 1, β ; 5, α .
O. verna, *Mærch.* Near Kirkliston, γ (pl.).
Pulmonaria officinalis, *L.* Arniston, δ (pl.).
Symphytum orientale, *L.* Trinity, ϵ (ouc.)

CONVOLVULACEÆ.

Convolvulus althœoides, *L.*, *var. italicus*, 1, α ?

Cuscuta ———? 5, β .

SOLANACEÆ.

Atropa Belladonna, *L.*, weed in garden, Trinity, α .

SCROPHULARINEÆ.

Verbascum nigrum, *L.* 5, α .

LABIATÆ.

Ajuga Chamæpitys, *Schreber.* 5, α .

Lycopus europæus, *L.* South Queensferry, γ .

Mentha rotundifolia, *Huds.* Railway bank at Slateford, ϵ (ouc.)

Salvia Horminum, *L.* 1, β .

S. viridis, *L.* 1, 5, γ .

PLANTAGINACEÆ.

Plantago albicans, *L.* 5, α .

CHENOPODIACEÆ.

Atriplex tatarica, *L.* Gorgie, γ ; *C. murale*, *L.* 1, 5, ϵ .
1, δ .

C. opulifolium, *Schrad.* 5, β ?

Blitum virgatum, *L.* 1, α . *C. urbicum*, *L.* 5, α .

Chenopodium hybridum, *L.* 5, *Suæda* ———? 1, α .
 α .

EUPHORBIACEÆ.

Euphorbia Cyparissias, *L.*, weed in garden, Colinton, δ .

E. Esula, *L.* Near Colinton, α .

E. exigua, *L.* Near Dalmeny, ϵ .

URTICACEÆ.

Humulus Lupulus, *L.* Slateford Railway Station; Dalmeny, γ (ouc.).

LILIACEÆ.

Allium oleraceum, *L.* Roadside at Carlowrie, ϵ .

A. paradoxum, *Don.* Carlowrie, ϵ (pl.).

Asparagus officinalis, *L.* Near Slateford, β (ouc.).

Maianthemum Convallaria, *Weber.* Linlithgowshire, ϵ (pl.).

Polygonatum multiflorum, *All.* Near Kirkliston, β (pl.).

PALMÆ.

Phoenix dactylifera, *L.* 1, 5, γ^* .

GRAMINÆ.

<i>Bromus Alopecuroides</i> , <i>Poir.</i> 1, γ .	<i>Polypogon maritimus</i> , <i>Willd.</i> 5,
<i>B. japonicus</i> , <i>Thunb.</i> 1, γ^* .	β in 1902; γ in 1903.*
<i>Cornucopiæ cucullatum</i> , <i>L.</i> 5,	<i>Poa bulbosa</i> , <i>L.</i> , <i>var. vivipara</i> .
<i>a.</i>	1, ϵ .
<i>Eragrostis major</i> , <i>Host.</i> 5, γ .	<i>Setaria glauca</i> , <i>Beauv.</i> 5, β .
<i>Hordeum sylvaticum</i> , <i>Huds.</i> 5,	<i>Trisetum pumilum</i> , <i>Kunth.</i> 5, β .
β .	<i>Wangenheimia disticha</i> , <i>Mærch.</i>
<i>Psilurus nardoides</i> , <i>Trin.</i> 5, β .	5, α , 1903.

NOTES.

Hedysarum coronarium, *L.*, was found by the late Mr. Allistair Murray in 1903 near Slateford, but was not then recorded. In September last I saw two or three in the same place.

Phoenix dactylifera, *L.*, I take to be the name of the tree which bears the common date of commerce, seedlings of which, with leaves four or five inches in length, I had in previous years observed in Leith, Slateford, and other places. At Slateford this year in a warm hollow a considerable number of much taller ones were seen, one of which measured 18 inches from tip of root to tip of leaf.

Polypogon maritimus, *Willd.* This plant I gathered in Leith Docks in 1902 and in 1903, but it is only now that I am able to record it by the kindness of Professor Hackel to whom a specimen was sent for identification. Professor Hackel remarks that it "differs from the type by its lobed panicle, which I never saw in typical specimens, nor found recorded in the literature." He therefore named it *P. maritimus*, *W.*, *forma (nova) lobata*, Hackel.

To Professor Hackel I am also indebted for the identification of *Bromus japonicus*, *Thunb.*, *Triticum ovatum*, *Gren. and Godr.* (*Ægilops ovata*, *L.*), and *Polypogon monspeliensis*, *Desf.*

[*Demazeria loliacea*, *Nym.* (*Festuca rothbællioides*, *Kunth*). My note on this plant in the "Annals Scot. Nat. Hist." for April 1904, may be somewhat misleading. There grew in 1902 and still grow, in what may be described as a crevice in the rocks quite near to the place where it once grew in great plenty, three or four little clumps each bearing two or three spikes yearly. It is therefore not extinct in the county of Edinburgh.]

OBSERVATIONS ON SOME CRITICAL SPECIES
OF SCOTTISH MOSSES.

By Dr. JAMES STIRTON, F.L.S.

THE specimen of *Didymodon Jenneri* (Sch.) presented to me many years ago by the discoverer, the late Mr. Howie, has turned up. An examination reveals the fact of its identity with *Cynodontium laxirete* (Dixon). I have had, besides, the privilege of examining the type-specimen in the Botanical Museum, Edinburgh, and it agrees in every particular with mine. The long narrow leaves, from 4 to 7 mm. in length, are characteristic, as well as the large quadrate areolation, etc. Moreover, Professor Schimper has given a detailed description of the moss in the "Transactions" of the Botanical Society Edinburgh, for 1868. He even mentions the shape of the cells, although the dimensions are not given, as writers of his time did not state such. As Howie's moss was described a quarter of a century previous to Dixon's, the latter must clearly yield to the former, which should now be called *Cynodontium Jenneri* (Sch.). This moss occurs in many places in the West of Scotland. It has also been found in Norway by Dr. Hagen, and described by him under the name *C. polycarpum*, var. *lævigatum* (Hagen). I may mention that the same moss was described by me in the "Annals of Scottish Natural History" under the name *C. polycarpoides*.

The following moss has puzzled me much and still puzzles me to a certain extent, more especially as regards the areolation of the leaf, and I am not yet quite certain of its systematic place, inasmuch as I have only one capsule of the previous year, the teeth of which are defective. It was first detected in 1880 on the northern slopes of Craig Chailleach, and again in 1901 on Craig-na-Saoine, a mountain several miles west of Killin.

CYNODONTIUM ASPERELLUM.—In lax, rather extended tufts, green above, light brown below, from 1 to 2 inches in height; stems strong, simple or slightly bifurcate; leaves laxly disposed round the stem, about 2.5 by 0.6 mm., straight and spreading from an upright slightly clasping base when moist, merely incurved when dry, lanceolate from an oblong base, apex bluntish entire, margin entire, recurved in the lower half but much more so on one side; nerve strong, pale yellow then red, breadth near base, 0.07 to 0.085 mm., solid, thick, projecting much behind, slightly tapering for more than a half upwards, vanishing below apex, papillose on both surfaces of the pagina and back of nerve, strongly but sparsely in lower half, much more faintly papillose on upper part; central basal cells bluntly oblong, separate, pellucid or nearly so, 0.025 to 0.04 by 0.008 to 0.011 mm., smaller outward, but only quadrate near and

at margin, upper central cells oblong, undulated, almost sinuose on margin 0.016 to 0.024 by 0.006 to 0.008 mm., with numerous connecting-tubes, corresponding marginal cells smaller and shortly oblong, this relationship of the cells continuing nearly to the apex; capsule on a long, pale red seta, nearly cylindrical, slightly curved, irregularly grooved, not strumose or annular at neck so far as perceptible.

This moss is unlike any form of *C. polycarpum* I have seen, and has quite a different habit, much more robust, stems stronger, stiffer, etc. I cannot reconcile myself to identifying it with any other species of the genus, not even with *C. gracilescens*. In several instances large propagula were seen at the apices of the leaves, roundly oblong, brownish, murali-divided internally, 0.1 to 0.14 by 0.02 to 0.027 mm.

What part the slender connecting-tubes mentioned above play in the economy of the plant is beyond me at present, but that they have a distinct bearing on the vegetative processes I have little or no doubt, otherwise why should they be constantly present in certain mosses, such as *Hypnum turgescens*, etc., and not in others rather closely related to them? At anyrate, to ignore the presence of these tubes, as is often done in the matter of diagnosis, is scarcely scientific, especially when the life-history of these small vegetable organisms is likely, in the near future, to assume considerable importance.

Since reporting, in the number of the "Annals" for April, 1905, the discovery, on Craig Mohr, Arisaig, of barren specimens of what I then considered *Dicranella curvata* (Hdw.), I have been making further investigations into the so-called organs of generation, viz., archegonia and antheridia. These organs are contained in separate, large, firm buds—larger in proportion to the size of the plant than any I have seen—situated, in great abundance, at the apices of stems and branches. What particularly arrested my attention in these buds is the presence, in both kinds of organs, of large, red, long, cylindrical, septate bodies, rounded at the upper end, abruptly narrowing below into the slender point of attachment (breadth, 0.02 to 0.028 mm.), while the ordinary pale or greenish, septate paraphyses, also present, are much shorter and only 0.014 mm. in breadth. Taking into account their greater length, these red bodies have nearly eight times the capacity of the ordinary paraphyses, and are much more numerous. I have not detected these red bodies in the specimen of *D. curvata* given to me by the late Mr. W. Wilson, author of "Bry. Brit." Besides the size, another peculiarity of the buds themselves is their tendency to assume, at an early stage, a deep red colour, at first only apparent below, but ultimately extending nearly to their summits. It is somewhat extraordinary that this moss should remain barren notwithstanding the close proximity of archegonia and antheridia.

So far as I can recall, this is the first instance where two distinct sets of bodies, both presumably of the nature of paraphyses, have been seen in conjunction; accordingly I have been induced to publish this description, in the hope that some botanist may be able to throw light on the subject, for hitherto I have no clue to an explanation. The inflorescence is dioicous.

As the areolation of this moss is laxer than in genuine specimens of *D. curvata*, while the margins of the leaves are sharply serrated in the upper third, as well as having frequently hyaline teeth on the back of the nerve in the same region, I think it right, meanwhile at least, to separate the two, and to name the moss under discussion *Dicranidia fusciorufa*.

In previous papers I have indicated the tendency of several species of the genus *Campylopus*, and notably of *C. purpurascens*, to have cucullate apices, as well as bulbous bases to the leaves. The first moss which acted as an incentive to the further investigation of this tendency was a *Campylopus* from the shores of Lake Nyami, in Central Africa, sent by the late Professor G. Dickie, of Aberdeen. This moss is allied to *C. atrovirens*. It has all the barren stems with leaves without hair-points, and their apices deeply cucullate, while the fertile stems, having at their apices crowded fastigiate tufts of branches, have all the leaves with long rough hair-points, and show besides aggregated setæ. Meanwhile I may be permitted to name, provisionally, this moss *C. Dickieanus*.

The following is also related to *C. atrovirens*, through the variety *incurvatus*, but is quite distinct from both.

CAMPYLOPUS PRASINORUFUS.—Tufts dense, from 1 to 2 inches in height, green above, with almost always a pale or yellowish narrow stratum beneath, and the rest below fuscous or fusco-rufous; stems simple or bifurcate; leaves closely arranged, appressed when dry, slightly spreading but straight when wet, lanceolate, slightly acuminate, apices bluntish, cucullate, bases bulging and radiculose; central basal cells in a few short perpendicular rows, pellucid or nearly so, oblong, small (0.024 to 0.035 by 0.01 to 0.014 mm.), outwards smaller and narrower to margin, where they are very narrow, *short*, distinct, and separate (0.015 to 0.022 by 0.004 to 0.005 mm.), upwards, next nerve, irregularly rhomboid or quadrate (0.016 to 0.024 by 0.006 to 0.008 mm.), while the marginal cells continue narrow, and near the apex very small and narrow (0.012 to 0.016 by 0.003 to 0.004 mm.), the latter continuing to the apex in five to eight or more perpendicular rows on each side of the narrowing nerve, which vanishes at or below the apex; nerve near base about one-third the breadth of leaf, tapering, thin (about 0.045 mm. thick), showing, in thin cross section, two anterior rows of cells of nearly the same size (from 0.005 to 0.013 mm. diam.), a third row behind these, of cells scarcely perceptible above but showing near

base as large as 0.006 mm., a posterior row of bulging cells, increasing downwards from 0.005 to 0.01 mm. near base, where they are still seen. Stereids, minute, are seen in abundance surrounding the second row of cells, but are also seen everywhere throughout the section. Large hollow or vesicular auricles are present, colourless, but in older leaves turning a light brown or reddish-brown colour. Sterile.

The other moss has also leaves which tend to become cucullate at the apex, and belongs to the section of which *C. flexuosus* is the type.

CAMPYLOPUS RUBIGINOSUS.—Densely tufted, 1 inch or more in height, bright green above, with a narrow yellowish band beneath nearly as in the previous moss, this colour deepening to a bright red towards the base; stems sparingly branched; leaves appressed when dry and slightly incurved in upper part, straight when moist, lanceolate from a slightly dilated base, shortly acuminate, very concave above, bluntish at apex and tending to become cucullate, serrulate on upper margin and with hyaline blunt teeth on the back of nerve in same upper region; central basal cells large, oblong, slightly chlorophyllose or hyaline, 0.03 to 0.045 by 0.012 to 0.016 mm., smaller outwards and near margin of the same size as those just above, upwards, cells quadrate or rhomboid, 0.01 to 0.014 mm. across, chlorophyllose, extending to apex in two to five perpendicular rows where, however, cells are longer and narrower (0.022 to 0.032 by 0.005 to 0.006 mm.); auricles large, hollow, composed of very large hexagonal hyaline cells (as large as 0.08 by 0.04 mm.), seldom tinged of a reddish colour. In older leaves the space at base is all hyaline, and slopes up to a point on the margin. Nerve one-fourth to one-third breadth of leaf near base, tapering and vanishing at or near apex. In thin cross section the nerve shows an anterior row of pellucid cells, 0.005 to 0.012 mm.; a second row of cells, 0.006 to 0.014 mm.; no proper third row nor bulging posterior row, but instead the alternately depressed and elevated cells on posterior wall from apex to base, 0.005 to 0.008 mm., a peculiarity not hitherto seen.

The deep-red lower zone is not owing to the presence of red radicles, which are rather sparse, but to the colour inherent in the cell walls. The peculiarities are such as to warrant a separation from either *C. flexuosus* or its var. *paradoxus*.

One of the very few mosses rescued from the herbarium of the late Mr. Alex. M'Kinlay is a *Campylopus*. The locality is not stated on the slip to which it is pasted, but as the date is still legible, viz., July 1865, I am inclined to believe that he secured it on the mountains of Clova. This suspicion is strengthened by the fact that the Rev. J. Fergusson sent me one nearly identical with it from Glen Prosen, a neighbouring valley.

CAMPYLOPUS PURPURASCENS, *var.* *KINLAYANUS*.—The peculiarity of this moss is in the structure of the nerve, where the second and third rows of cells are nearly obliterated, their places being filled by crowds of large stereïds. To compensate for this deficiency, the cells of the anterior row are larger than usual, and near the base have a diameter of 0.034 mm., while, in the same relative position, the posterior bulging cells are enlarged to 0.018 mm. The auricles are rather better defined, but their cell-walls are thin, with the usual narrow dash of red next the nerve. The thickness of the nerve near the base is about 0.07 mm.—thicker, indeed, than in any other species I have seen. As a consequence, the swelled bases of the leaves are well pronounced, more especially as scattered minute cells, 0.004 to 0.006 mm. diameter, are seen along with the stereïds in the same situation.

Taking the areolation and papillosity of the leaves alone into consideration, it would be difficult to discriminate *Barbula fallax*, *B. rigidula*, *B. insulana*, and *B. reflexa* from one another. On the whole, the upper cells of *B. reflexa* are slightly larger. Many years ago I separated from *B. insulana* a moss detected near Innellan on the Clyde, in which the upper very minute cells were seen quite distinctly and separately, owing to the almost entire absence of papillæ. This I named *B. assimulans*. Although I now recede from my former opinion of giving this moss specific distinction, it may still be retained as a variety.

This year, at Connel Ferry, I detected a moss on the ground near the roadside, which has characters differing from any of the four already mentioned, inasmuch as the papillæ are more pronounced as well as larger, and the upper cells have each an area three or four times that of the corresponding cells in the others.

BARBULA VIRIDESCENS.—Laxly tufted, of a bright green colour above, light brown below, 1 inch or a little more in height; stems simple or somewhat fastigiately branched; leaves rather laxly disposed around the stem, widely spreading and straight when moist, incurved and slightly twisted when dry, broadly ovate at base, narrowing rapidly, slightly acuminate above and tapering to an acute point; length from two to three times greatest breadth, or 1.7 to 2 by 0.66 to 0.8 mm.; rather narrowly reflexed on margin in lower half or more, plane and entire upwards to apex; nerve strong, 0.08 to 0.1 mm., broad near base, tapering, and ceasing just below apex; strongly papillose on pagina, back of nerve and margin, papillæ from 0.0025 to 0.004 mm. in height; central basal cells few and small, in two or three short perpendicular rows, roundly oblong, 0.017 to 0.022 by 0.008 to 0.011 mm., the rest of the cells in basal region much as those above, upper cells round or hexagonal, separate, distinct, and granular, 0.009 to 0.013 mm.,

a little longer near the base; capsule on a longish, red seta, upright or slightly bent, long, cylindrical with a straight, subulate lid as long as the capsule itself, covered by a slender, dimidiate calyptra; teeth red, long, not fully matured.

This moss is evidently more allied to *B. spadicea* than to the others. At first blush it has more the appearance of a form of *Dichodontium pellucidum*, which grows about 200 yards distant from it, and in colour almost identical.

With reference to *D. pellucidum*, I may state here that I have a moss from Mrs. Cunningham Graham of Gartmore, with leaves exactly as in *D. flavescens*, but showing short, ovate capsules as much cernuous as in *D. pellucidum*.

Dr. Braithwaite states, in his work on *British Mosses*, that he has never seen such a combination, accordingly he has distinguished *D. flavescens* as a species from *D. pellucidum*, although almost every other bryologist inserts *D. flavescens* as merely a variety of it.

LEPTOTRICHUM COMPACTUM (Strn.) from Ben Lawers, of which I gave a description many years ago, is certainly distinct from the variety *densum* of *L. flexicaule*, to which Dr. Braithwaite refers it. By the way, the variety *densum* is also found on Ben Lawers, and is not infrequent on the West Coast, as at Connel Ferry, etc.

In very dense tufts 2 to 3 inches in height. Stems densely interlaced throughout with strong red radicles, simple or slightly branched; leaves widely spreading from an upright, broad, slightly clasping base, which is slightly wider above, suddenly narrowing into the transversely concave, subulate upper part. The expanded basal portion is one-third the length of leaf, which is about 2 mm. Central basal cells bluntly oblong, 0.025 to 0.04 by 0.008 to 0.011 mm., in three to five short perpendicular rows, outward smaller, and near margin, much as those above; upper cells large, ovate, 0.011 to 0.017 by 0.007 to 0.009 mm., somewhat smaller near margin, slightly longer near the narrowly-rounded entire apex which is very often tipped with a single hyaline cell, or by a hyaline border; nerve strong below, well defined, turning reddish, about one-fourth the breadth of base, tapering and vanishing below apex. Almost constantly there is seen a single and, at times, a double row of long, slender pellucid cells at alar base, and for a considerable distance upwards; dimensions, 0.018 to 0.024 by 0.004 mm.

At various times during my rambles on the mountains, I have got on Ben Lomond and on through Ben Voirlich to the Breadalbane ranges, a minute, densely-tufted moss, always in a barren state, which I generally threw away. One small tuft I sent to Professor Schimper, of Strasbourg, who returned it with the remark to the effect that he failed to recognise the plant, but thought it might be a form of *Dicranella varia*. Recently I alighted on the identical tuft sent. An examination of the leaf revealed areolation quite

different from that of *D. varia*, as well as different from that of *Leptotrichum homomallum*, var. *zonatum*, to which, however, the moss from Ben Lomond belongs, inasmuch as, in the latter, the cells are nearly linear and narrow, much as in the main form.

LEPTOTRICHUM CONFERTUM.—Very compactly tufted, green or greenish above, dark red below; stems simple or bifurcate; leaves densely disposed, minute, about 0.65 mm. long, slightly incurved when dry, spreading somewhat and straight when moist, from a broadly oblong base, rather abruptly narrowed into the short, slightly concave, entire subula, margin entire throughout; nerve broad, one-third breadth near base, thin, indefinite at the edges, reaching or protruding a little beyond pagina; cells minute throughout, quadrate or rhomboid, 0.009 to 0.013 by 0.005 to 0.007 mm., with several cells at central base a little longer, viz., 0.017 mm. (on King's Seat, near Killin, 1868).

The cells are larger than those of *L. flexicaule*.

In the western ravine of Ben Lawers I discovered, in 1865, a curious moss.

HYPNUM ANOMALUM.—Stems slender, straggling over the ground or other mosses, long, undulating, pale, ultimately nearly black, emitting at irregular intervals secondary stems, which in turn are irregularly, but not infrequently somewhat pinnately, branched; leaves rather closely set in a complanate, almost distichous, manner; broadly ovate acute, not acuminate, or only slightly so; gibbous, *i.e.*, the lower border of the pagina rounded at the base, narrowly attached to the stem, or not infrequently terminating on the nerve at its base; the upper wing of the pagina broad where it is attached perpendicularly, not transversely, to the stem, and there margin often shortly incurved, margin plane strongly serrated all round; nerve strong, yellow, at times reddish near base, tapering, and ceasing a little below apex; cells at alar base in a small group, roundly oblong, concolorous (or reddish), 0.018 to 0.024 by 0.009 to 0.012 mm.; rest of cells narrowly and acutely rhomboid, or even fusiform, 0.04 to 0.06 by 0.004 to 0.006 mm., a little broader near base and blunter near apex; leaves on the main stem scattered, more acuminate, and nerve relatively shorter. I cannot associate this moss with any other. *Hypnum distans* comes near it, but its leaves are quite symmetrical, etc. One rosette is present, composed of narrow, squaroso-recurved, serrated, narrowly-acuminated leaves. This in all likelihood contains organs of generation.

In the same patch with the preceding grew a *Plagiothecium*, having leaves terminating in long hair-like acumina, much as in *P. piliferum*. The latter I discovered in 1864 on Ben Voirlich, by Loch Lomond, growing throughout a form of *Dicranum uncinatum*. The present differs from it in several important particulars.

PLAGIOTHECIUM TRICHODEUM. Stems slender, straggling, turning a dark colour, irregularly branched; branches with leaves rather laxly and divaricately disposed, as well as arranged almost bifariouly, slightly oblique, ovate or narrowly so, gradually acuminate and the apex attenuated into a long, slender, hair-like acumen, not infrequently 0.27 mm. long, at times longer, margin plane or a little incurved on one side at the rounded base, entire, shortly two-nerved: cells at base bluntly oblong, generally in one row across, but in two or three rows at margin, 0.025 to 0.035 by 0.018 to 0.022 mm.; the rest of the cells very long and sharply fusiform, or elongatorhomboid near the base, 0.09 to 0.13 by 0.007 to 0.01 mm., or near the base, breadth as much as 0.013 mm. Slender stolons are present, with minute narrowly-pointed leaves. The shape of the leaf as well as the areolation are quite different from those of *P. piliferum*, inasmuch as the latter has leaves nearly ellipsoid, and cells the narrowest almost of any in the genus, viz., 0.004 to 0.005 mm. broad.

CERATODON CONICUS is found in the Orkneys, more plentifully in the Outer Hebrides, but hitherto only in a barren condition. In 1904, at Arisaig on the West Coast, I alighted on a curious form. The tuft was rather lax, leaves much longer and more slender than usual, slightly twisted in a dry state, nearly straight when wet. The remarkable condition is that the sharply-pointed, excurrent nerve is extruded beyond the pagina from 0.3 to 0.6 mm. and turns, at an early stage, to a deep red—indeed, much earlier than the reddening of the nerve at the base. I propose to name this *C. conicus*, var. *acicularis*.

Atrichum angustatum was got this year near Connel, and *Heterocladium heteropterum*, var. *flaccidum*, as well as, in all likelihood, *Schistidium teretinerve* (Limpr.), at Dunstaffnage Castle. *Hypnum hispidulum* (Brid.), has also to be recorded from Ben Lawers, as well as a rather curious form of *H. chrysophyllum* (Brid.).

GLASGOW, 14th December 1905.

ZOOLOGICAL NOTES.

Notes on some Birds seen in North Uist.—The following Birds, among others, were seen at Newtown, Lochmaddy, North Uist; between 2nd February and 2nd March 1906.

Stonechat. Two pair near Geireann Mill.

Reed Bunting. Several near Geireann Mill.

Short-eared Owl. Saw one pair several times behind Newtown.

Hen Harrier. One pair still nests annually near Langash.

Peregrine. Saw one on 4th and 6th Feb. 1906.

Merlin and Kestrel. Occasionally seen.

Heron. Common, and a great nuisance to the wild-fowler.

Grey Lag Goose. More than usually numerous towards end of February.

White-fronted Goose. Is rarely got here.

Brent Goose. Flock of 160 off Lingay on rough wild days.

Bernacle Goose. More than usually numerous.

Bewick's Swan. Three seen on 7th Feb. 1906, four on 1st March 1906.

Sheld Duck. Common and increasing. They nest here.

Wild Duck. Nothing like so numerous as usual.

Gadwall. When they appear they nearly always visit Loch an Sticir. On being shot at, they "bunch" together so that usually more than one are killed at one shot.

Pintail. One was shot here in December 1905, I am told.

Teal. Nothing like so numerous as usual.

Wigeon. Very common. The principal duck. Said not to breed here.

Pochard. Occurs occasionally, I think I saw one on 20th February, Scaup. One shot in Dec. 1905.

Golden-Eyed Duck. More numerous than usual, several males in full plumage.

Velvet Scoter. One shot in Dec. 1905, I am told.

Goosander. Seen in Autumn 1905 for first time.

Smew. Seen several times in South of Harris, but no males.

Red Grouse. A few, decreasing.

Pheasant. The leg of one left in a trap was found on 4th Feb. 1906.

Water Rail. One seen on 6th Feb. 1906.

Coot. Very common in Berneray; not so in N. Uist.

Woodcock. Not so numerous as usual.

Snipe. Not so numerous as usual. Heard one "drumming" on 4th Feb. 1906.

Jack Snipe. Not so numerous as usual.

Greenshank. Fairly numerous, said not to nest here, which I doubt.

Bar-tailed Godwit. Flocks of twenty, ten, and forty, 6th Feb. 1906.

Lesser Black-backed Gull. Common.

Fulmar Petrel. My dog caught one on 1st Mar. 1906.

HUGH S. GLADSTONE, Thornhill, Dumfriesshire.

Uncommon Birds in Lochbroom.—Lochbroom can boast of a few rare birds of late years. When visiting the Summer Islands on the 21st of October 1897, I observed a small flock of birds of a peculiar flight skimming over the water. One came within shot and

was obtained. It was sent to Mr. Harvie-Brown, who informed me that it was the Great Shearwater (*Puffinus gravis*)—a rare bird on the West Coast. In 1901, on the 1st of September, a Richardson's Skua (*Stercorarius crepidatus*) was shot in the neighbourhood of Tanera Island. A few days later seven Skuas were observed at the mouth of Ullapool River harassing the Gulls, but what kind of Skuas they were I could not say. Since 1901 I am not aware that a Skua has been seen in Lochbroom. On the 8th day of September 1904—a very stormy day—when looking out through falling flakes of snow, I observed a large Black-headed Gull feeding near to my house. This was the first gull of this kind I ever saw. It was also seen by others. Might it not possibly be the Great Black-headed Gull? Only the other day—28th January 1906—I observed on the beach at Shore Street, Ullapool, an Iceland Gull (*Larus leucopterus*). It was somewhat late in the day and having to go from home on the following day I asked the Rev. Mr. M'Donald, M.A., to look out for it in my absence. This he did, and observed the bird feeding among a flock of young Herring Gulls, on the shore below his house. It was afterwards shot and given to me. The ground colour of the whole plumage is white, mottled with light brown. The primary wing feathers are pure white. The brown about the eyes is rather dark; and the bill and legs are of a pale flesh colour—tinged with green.—JAMES T. HENDERSON, Ullapool.

Northern Bullfinch in Shetland.—In the last number of the "Annals," p. 51, Mr. Tulloch communicated an interesting note on the occurrence of Bullfinches in Shetland. I had no doubt at the time that the birds seen belonged to the large Northern European and Siberian form known as *Pyrrhula major*, and expressed a desire to see a specimen. Thanks to Mr. Tulloch's good offices, Mr. Robert Russell kindly forwarded a female for inspection which had been obtained on the Island of Fetlar on 4th November 1905. This proved to be an undoubted example of species named, the wing measuring 3.67 inches, and thus a new bird has been added to the fauna of Scotland. The species, however, has been obtained once or twice on the Yorkshire coast, but not elsewhere in England or in the British Islands.

During the past autumn quite a number of these birds seem to have arrived in Shetland, for, in addition to those mentioned for the Mainland and the Islands of Foula and Fetlar, one or more visited Fair Isle in November, and came under the notice of Messrs. J. W. Anderson and George Stout. In the spring of 1905 several Bullfinches appeared in Unst, most probably on their return journey to their northern summer haunts. The first of these was noted on 19th March, and others were observed between 16th and 26th April, as recorded in the "Annals" (1905, p. 182), by Dr. Saxby. Strange to say, these birds, like the Lapp Buntings, would seem

to have escaped detection elsewhere in the British Islands ; for none have been recorded in the pages of the serial literature devoted to natural history subjects.—WM. EAGLE CLARKE, Royal Scottish Museum, Edinburgh.

Peregrine Falcon captured at a Lighthouse.—A Falcon was captured at Sanda Lighthouse, south of the Mull of Cantire, under the following circumstances :—On 26th December 1905, we were sounding the siren, for the night was thick with haze, when at 1.30 A.M., while standing at the engine-house door, the rays from the lantern being very distinct, I saw and heard two Pewits flying around, and what appeared to be a larger bird. I went up to the light-room and then out on to the balcony, where I felt a bird flapping about my feet. I put down my right hand to secure it, but instead of taking hold of it, it took hold of me, gripping me with its claws in a way that I am not likely to forget in a hurry. I then put down my other hand, when it was seized by the bird's beak ; I suffered excruciating pain, and had to call for assistance ere I could shake off mine enemy and secure him. My hand was sore and swollen for several days, as the result of this unexpected encounter. I think the Falcon must have been pursuing the Pewits, and when making a pounce at one of them, had come in contact with the dome of the lighthouse and then fallen, in a stunned condition, on to the balcony.—JOHN MACEWEN, Sanda Lighthouse.

[An immature female Peregrine Falcon was sent to us for identification.—EDS.]

Capercaillie in Ayrshire.—I think it would be of interest to readers of "The Annals" to know that a female Capercaillie (*Tetrao urogallus*) was killed on 14th December 1905, near Tarbolton Moss in Ayrshire, which is surely very far south for it to have strayed.—HUGH S. GLADSTONE, Thornhill, Dumfries.

[Mr. John Paterson in his useful list of the birds of the Clyde area, tells us that this species was introduced unsuccessfully into Ayrshire. Can some of these have survived?—EDS.]

King Eider in Orkney.—I have to record the occurrence of an adult female King Eider (*Somateria spectabilis*) which was shot off the Island of Graemsay, Orkney, on Wednesday, 21st February, by S. Sutherland of that island. The specimen which was sent to me differs much from the Common Eider, chiefly in its plumage being much more rufous, the chin, throat, and cheeks light chestnut, and the chin and upper throat being without any black markings. The upper part of the breast is rufous, and from the centre of the breast to the abdomen sooty black. The crown of the head rufous with narrow streaks of black ; moreover, the head is flatter on the top than in the common Eider. The feathered wedge on the culmen reaches as far as the nostrils, and the bare

spaces on either side of it are twice as broad and of a totally different shape from those of the common species. The feet are dull yellow and the webs black. The nail on the bill is of the same colour as the rest of that organ, and the inner secondaries sickle-shaped.

There are over a score records for this species for our Islands since 1813, and of these four have occurred in Orkney and one in Shetland, viz. in November 1832, May 1868, December 1869, March 1884, February 1899, and a young drake was seen by Mr. J. G. Millais in the spring of 1883 near the churchyard rocks off the western promontory of Pomona, about which there was no doubt whatever as he was close enough to the bird to see the curious shape of the head so characteristic of the drake of this species. The bird shot on 21st February was a single one and very wild.—H. W. ROBINSON, Lansdowne House, Lancaster.

Surf Scoter in Orkney.—During the week between 14th and 21st December last an adult male of the Surf Scoter (*Edemia perspicillata*) was observed inside Stromness Harbour, Orkney, but escaped being shot, although many envious eyes were cast upon it. Young birds of this species are of commoner occurrence in Orkney than most people think, and hardly a winter passes without one or more of these young birds being seen among the Velvet Scoters when they first arrive from their northern nesting haunts, but are almost if not quite unapproachable. The adult bird, however, is very much rarer, and I think only half a dozen are on record as having been actually shot in Orkney.—H. W. ROBINSON, Lansdowne House, Lancaster.

Goosanders in Forth.—Mr. W. M'Dougall, of Glasgow, shooting on Carron-side, near Kirk o' Muir, shot an adult male Goosander. So far as I am aware, this is the first record of the occurrence of the bird upon the running river above Denny. But as long ago as 1870, in the month of March, I have myself seen many large parties of Goosanders, on the open and exposed surface of Loch Coulter, brilliant in salmon-pink flushed breasts and sides. I have seen there as many as seventy in one company. W. M'Dougall's specimen was shot towards the end of February 1906. I will not be surprised to learn of their nesting *soon* in the well-adapted "braes" and rocky glen of the Upper or Middle Carron. I base my observation upon previous experience of accumulated facts in the progress of the dispersal of the species from N.W. congestion to S.E. overflows.—J. A. HARVIE-BROWN.

Woodcocks in Shetland in 1905-6.—The bag of Woodcocks to one gun in the north—Mr. R. C. Haldane's—Lochend, Ollaberry, was eighty-one for season 1905-6, of these the later killed—February 1906—were believed to be "Returning Migrants going north," or,

(?) birds which might have stayed and nested? In the summer of 1905 there appears to be no doubt Woodcocks did nest in Shetland. It will be remembered that an unusual "rush" of Woodcocks took place to Shetland in the autumn of 1903-4, in which season R. R. Haldane shot over 130 to his own gun.—J. A. HARVIE-BROWN.

Richardson's Skua at Kincardine-on-Forth.—On 18th September Mr. Joseph M'Naughton shot at Richardson's Skua (*Stercorarius crepidatus*) at Kincardine-on-Forth, and six others were seen. This record is interesting, because these birds are not often seen so far up the Firth.—J. A. HARVIE-BROWN.

Are Birds' Eggs destroyed by Wasps?—On 29th May, 1904, I visited an old sand-pit where a colony of Sand Martins (*Cotile riparia*) used to nest. I found the birds still there but in reduced numbers. On examining their nesting holes, I discovered four with the paper-like wasps' nest suspended from the roof. These I destroyed, and found that there were eggs in each of the nests, but all of them had been pierced by a hole, so small as to be scarcely visible, and sucked empty. Could this possibly be the work of the wasps? Three of these nests contained five eggs each, and the fourth had six. I am sorry that I did not secure a specimen of the wasp.—T. THORNTON MACKETH, Caldwell, Renfrewshire.

[We have never before heard of such a case.—EDS.]

Insects from Fair Isle.—As the Coleoptera and Diptera collected by Mr. W. Eagle Clarke on Fair Isle in September last year will be dealt with in separate papers, it may be of interest to place on record the few insects belonging to other orders obtained there at the same time. The Lepidoptera are represented by two species, viz. *Plusia gamma*, L. (three specimens) and *Hydrocia micacea*, Esp. (three specimens), and the Hemiptera by three examples of *Calocoris bipunctatus*, F., and a male, female, and nymph of *Velia currens*, F. The Hymenoptera are of much interest, inasmuch as there are nine specimens (1 ♂ and 8 ♀ ♀) of the beautiful *Bombus smithianus*, White, varying in size from 10 to 20 mm., a male of the race *ruginodis* of *Myrmica rubra*, L., and a single specimen of an *Ichneumon* allied to or perhaps identical with *extensorius*, L. The Trichoptera, Orthoptera, and Aptera are respectively represented by a species of *Limnophilus* (one specimen), several females of the common *Forficula auricularia*, L., and numerous examples of *Machilis maritima*, Leach. Mr. Clarke informs me that a native showed him specimens of *Pyramcis cardui*, L., which had been taken on the island.—PERCY H. GRIMSHAW, Royal Scottish Museum, Edinburgh.

Flea from the Orkney Vole.—A flea taken from a specimen of the Orkney Vole (*Microtus orcadensis*) captured at Stromness last

August has been identified by the Hon. N. C. Rothschild as *Cerato-phyllus mustela*, Wagner, a widely distributed but not very common species in England. This, however, does not in the least prove that the Orkney Vole has not a flea peculiar to itself. Another species of flea, taken from a House-mouse (*Mus musculus*) captured in Stromness, has been identified by the same naturalist as *Ctenopsylla musculi*.—ROBERT GODFREY, Edinburgh.

BOTANICAL NOTES AND NEWS.

Lamium purpureum, L., "var., *decipiens*, Sonder."—My friend Mr. W. Whitwell having sent me a specimen of a *Lamium* with the query "*L. purpureum*, var. *decipiens*, Sondr., or *L. incisum*?" caused me to look up the descriptions and references to Sonder's plant. To my surprise I found the plant really belongs to *incisum*, as Sonder himself points out. The history of the plant seems to be as follows:—Sonder sent Koch a notice of this *Lamium* under the names of *purpureum*, β *decipiens*; and he published it in the 2nd ed. of his "Synopsis Floræ German. et Helvet.," ii. p. 749, 1844. In 1851 Sonder, in his "Flora Hamburgensis," 327, gives these references:—

Lamium incisum, Willd.

L. confertum! Fr. herb. norm., x., 16.

L. westphalicum Weihe!¹

L. purpureum, β *decipiens*, Sonder, in Koch, "Syn." and he refers to "English Botany," t. 1933, as representing his plant. On this plate of "E. B." is drawn a part of a corolla with a ring of hairs in it. J. de C. Sowerby notes on the drawing,² "*L. purpureum*, observe the hairs in the tube of corolla." On this Sir J. E. Smith adds, "I think this should be engraved in the plate and marked '*L. purpureum*.'" No note of this appears in the third edition, so that the plate apparently contradicts the text. Of the names Sonder gives, *incisum* dates from 1800, *confertum* from 1843, and "Summa Vegetabilium Scand.," 1846, and *westphalicum* from 1822. So far back as 1843 Babington in his "Manual" notes a variety of *purpureum* with more cut leaves, but gives it no name, Sonder's name only appearing in the last (9th) edition. In the "Exch. Club Report" for 1886, p. 157 (1887), he remarks "Where is this name (i.e. *decipiens*) to be found. I do not see it in Nyman. Is it my deeply-cut-leaved form which is intended? I suppose so."

Prahl ("Krit. Fl. Schl.-Holstein," p. 169, 1890) notes that Sonder

¹ Was not the name originally written *guestphalicum*? but I do not possess the "Bot. Zeitung."

² Garry, in "Notes on the Drawings for English Botany," 143, Suppl. to "J. of Botany," 1904.

refers his plant to *incisum*, but uses the name *L. hybridum*, Villars, "Fl. Dauph.," i. 250, 1786. (In his second volume it should be noted that Villars reduces his plant to a var. of *purpureum*). There is also the name *L. dissectum*, With., "Arr. Brit. Pl.," ed. 3, vii. 527, 1796. G. Meyer also called it a hybrid, *L. amplexicaule* × *purpureum*, in 1849. Syme ("Eng. Bot.," ed. 3, vii. 73, 1867) seems to be the first British author to use Sonder's name.

Various authors reduce *incisum* to a sub-species¹ of *purpureum* = others to a variety.²

Thus the variety of *purpureum*, called *decipiens* by British botanists (with the ring of hairs in the corolla) seems not to be Sonder's plant.—A. BENNETT.

***Alchemilla vulgaris*, L., and *A. conjuncta*, Bab.**—In the "Ann. Scot. Nat. Hist.," 1895, pp. 47-49, the Rev. E. F. Linton gave the result of many specimens submitted to M. Buser of Geneva (who had written on and studied these plants).

These forms were identified by him as British; *i.e.* *A. vulgaris*, L.

a, *pratensis* (Schmidt), b, *alpestris* (Schmidt),
c, *filicaulis* (Buser),

the parenthesis of course meaning the names had been given as species. Reference was also made to varietal names of 1823 and 1824. In Schmidt's original descriptions in his "Fl. Bohemica," 1794, p. 88, they appeared as species. Pohl in his "Tentamen Fl. Bohemica," 1810, p. 152, describes as varieties eight forms under *A. vulgaris*, L.

Of these his a, *pratensis* = *A. pratensis*, Schmidt.

δ, *alpestris* = *A. alpestris*, Schmidt.

his other names are :—

β, <i>sylvestris</i> .	ε, <i>conglomerata</i> .	η, <i>hybrida</i> .
γ, <i>montana</i> .	ξ, <i>paniculata</i> .	ν, <i>glaberrima</i> .

Under "hybrida" he refers his plant to *A. vulgaris*, β *hybrida*, L., *Sp. Pl.* p. 179, = *A. hybrida*, Mill., "Dict." n. 2, *A. pubescens*, Lam. "Ill.," n. 1703; and *glaberrima* = *A. vulgaris*, γ, *glabra*, DC., "Fl. Fr."

Judging by the description, his *paniculata* may be the same as *filicaulis*,³ but of course specimens could alone decide this.

So it would seem by the above that our two plants, as varieties, should bear Pohl's name.

***A. conjuncta*, Bab.**—In the "Journ. Botany," 1881, p. 1, Mr. W. Matthews speaks of this plant being ignored by every other botanist except Nyman. But it would appear to have been known to

¹ Hartmann, "Hand. Sh. Fl." ed. ii. 91, 1879.

² G. Meyer, "Chl. Hannov." 298, 1836.

³ Ascherson and Graebner, "Syn. Fl. Mitteleurop. Flora," give *A. glaberrima*, v. *flexicaulis*, Schirz.

several; e.g. Ducommun in 1869 ("Taschenb. Schweiz. Bot.," p. 227) named it *A. alpina*, β *Godeti*, and what would seem to be the same plant is named *A. alpina*, β *podophylla*, Tausch? in "Flora," 1841, p. 108, while what seems to represent our usual *alpina* is named v. *glomerata*.

In the recently issued "Notes from the Royal Bot. Garden, Edinburgh," 1904, p. 108, it is said "has been reported from Cumberland, but on faith of a record by Mr. Bowman"; but Mr. Watson ("Cyb. Brit.," i. p. 363, 1847) states that "the late Mr. Bowman expressly stated that the plant brought by himself from Gatesgarth Dale was *A. alpina*, which remained unchanged in his garden."

A. alpina just lives in a Surrey garden, while *A. conjuncta* seeds freely, young plants come up in plenty, and produce exactly the same form as the parent. Though planted side by side, I never saw any signs of hybrids being produced. The Rev. R. Wood, in a letter dated 6th October 1873, remarks, "I could offer a great rarity which Syme disputes being found in Great Britain. Mine is the genuine plant, and certainly was taken from a mountain in Lake district. It was found by Mr. Dickenson, who has the original plant in his garden." That the specimen sent me was *conjuncta* there is no doubt, but whether Mr. Wood had been imposed on it is difficult to say. Mr. Hodgson (*Fl. of Cumberland*, 1898, p. 107) disposes of the plant rather curtly, quoting Mr. J. G. Baker's opinion, "I believe to be merely a variety of *alpina*." Certainly it is an odd variety if it is so, for *alpina* refuses to do at all points what *conjuncta* consents to in cultivation. *A. alpina* refuses to respond in any way to excessive manuring—it dies! while *conjuncta* simply luxuriates in it, and seeds freely in that condition, equally so in soil composed of $\frac{2}{3}$ Redhill sand and $\frac{1}{3}$ garden mould. In this soil *alpina* lives and flowers, perfecting a few seeds, but does not increase.

In "Eng. Botany" Dr. Syme aptly describes the Clova plant from Mr. A. O. Black (of which I possess a specimen with the date August 1853, by Mr. F. Hanbury's kindness); still I believe the specimen I have to be *conjuncta*, and not *alpina*. It is strange it has not been regathered at Clova or in Arran.

Certainly Mr. Watson's remarks ("Comp. Cyb. Brit.," 1870, p. 470) on Mr. A. O. Black read rather hard; but though he had to contend with much doubtful matter, his remarks read now almost too incisive, as he himself admitted to Mr. J. G. Baker ("Journ. Bot.," 1881, p. 264) in his later years.—A. BENNETT.

A. conjuncta, *Bab.*, and *A. alpina*, *L.*—In supplement of Mr. Bennett's remarks on the behaviour of these plants in cultivation, it may be worth mentioning that both have been growing in my garden, near together, for about twenty years, that *A. conjuncta* reproduces by seed very freely, so as to be apt to become a troublesome weed;

that *A. alpina* also reproduces by seed, but sparingly; that among the seedlings I have not found a single intermediate form; and that both plants retain their distinctive characters; and that a slightly more luxuriant growth is the only feature in which *A. alpina* differs from the plant brought to the garden by me from a shingly sand-bank by the river Dee. *A. conjuncta* was given to me by the late Dr. Buchanan White from his garden, and I do not know whence he got it. The soil in which the plants grow in my garden is a naturally poor loam about nine inches deep over a bed of sand, and it is never manured or dug over.—JAMES W. H. TRAIL.

Alchemilla vulgaris, *L. segregates*.—Additional to the list given on p. 38 of this volume and those I published in the "Journal of Botany" (1895, 110) are the following records which have come under my notice—

A. vulgaris, *L.*, sensu stricto = *A. pratensis*, Schmidt, 84 (*A. Somerville*), 90 (*H. J. Riddellsdell*), 100 (*A. Somerville*).

A. alpestris, Schmidt, 84 (*A. Somerville*), 98 (*fide C. E. Salmon*), 100 (*A. Somerville*), 101 (*hb. C. E. Salmon*).

A. filicaulis, Buser, 84 (*A. Somerville*), 100 (*A. Somerville*), 100 (*E. S. Marshall*), 111 (*Hb. Boswell Syme*).—E. F. LINTON.

CURRENT LITERATURE.

The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—January-March 1906.

[The Editors desire assistance to enable them to make this Section as complete as possible. Contributions on the lines indicated will be most acceptable and will bear the initials of the Contributor. The Editors will have access to the sources of information undermentioned.]

ZOOLOGY.

BIRD NOTES FROM SHETLAND (MAY TO NOVEMBER, 1905). T. Edmonston Saxby, *Zoologist*, January 1906, pp. 35-36. Notes on various species, including the Scops Owl.

WHOOPEERS IN ISLAY. Flora Russell, *Zoologist*, February 1906, p. 74. Ninety-eight birds seen on Ardnave on 6th December 1905.

ALBINOS IN NATURAL HISTORY MUSEUM. R. L., *The Field*, 10th March 1906, p. 389. Refers, among other things, to a partially albino wood-pigeon from Ardmeallie, recently presented by Sir Arthur Clay, Bart.

LANDRAILS IN DECEMBER. H. B. M., *The Field*, 6th January 1906, p. 36. Several killed at Balavil, Kingussie, during a snow-storm in the month indicated.

THE VENDACES OF LOCHMABEN AND OF DERWENTWATER AND BASSENTHWAITE LAKES, COREGONUS VANDESIUS AND COREGONUS GRACILIOR. C. Tate Regan, B.A., *Ann. and Mag. Nat. Hist.*,

February 1906. A description given of *Coregonus vandesius* from Castle Loch and Mill Loch, Lochmaben.

LEPIDOPTERA AT RANNOCH IN 1905. E. A. Cockayne, F.E.S. *Entomologist*, February and March 1906, pp. 38-40 and 53-55. A general account of species collected in May and June.

AMBLYPTILIA COSMODACTYLA, HB. (ACANTHODACTYLA, Tr.), AB. NIVEA, NOV. AB. Eustace R. Banks, M.A., F.E.S., *Ent. Record*, February 1906, p. 39. A new and striking aberration named from specimens supposed to have been captured some years ago in Sutherlandshire.

PTINUS TECTUS, BOIDD, IN SCOTLAND. T. Hudson Beare, *Ent. Mo. Mag.*, February 1906, p. 40. Several taken by Mr. W. Evans near the Carnegie Park, Dunfermline, on 28th October. This note refers also to an example taken by Mr. G. Ellison, in August 1905, at Stromness. In all cases the species appears to have been introduced from abroad.

HYMENOPTERA ACULEATA TAKEN BY COLONEL YERBURY, R.A., IN SCOTLAND, 1905. Edward Saunders, F.R.S., *Ent. Mo. Mag.* March 1906, pp. 60-61. A short paper, referring principally to the capture of *Pemphredon wesmaeli*, Mor., at Nethy Bridge in June and July (the first definite British locality for the species), and *Crabro carbonarius*, Dahlb., at Brodie and Nethy Bridge in June. Other species mentioned are *Myrmica rubra* v. *sulcinodis*, *Agenia hircina*, and *Crabro tibialis*.

ACULEATE HYMENOPTERA AT FILLANS, PERTHSHIRE: 9TH JUNE TO 5TH JULY 1905. G. A. James Rothney, *Ent. Mo. Mag.*, January 1906, p. 14. A list of 32 species, all named by Mr. Edward Saunders.

RHYACOPHILA MUNDA, M'L., AND HALESUS GUTTATIPENNIS, M'L., IN SCOTLAND. Kenneth J. Morton, *Ent. Mo. Mag.*, March 1906, pp. 65-66. Both species taken by Mr. W. Evans, the former near Eddleston, Peeblesshire, and the latter at Cobbinshaw Reservoir.

LEPTOPHYES PUNCTATISSIMA IN WIGTOWNSHIRE. J. G. Gordon, F.E.S., *Ent. Record*, March 1906, p. 77. Specimen captured at the Garheugh Rocks, Luce Bay, on 15th October.

A GUIDE TO THE STUDY OF BRITISH WATERBUGS (AQUATIC HEMIPTERA OR RHYNCHOTA). G. W. Kirkaldy, *Entomologist*, March 1906, pp. 60-64. In this useful paper the Scottish distribution of the various species is indicated.

DIPTERA IN DUMBARTONSHIRE IN 1905. J. R. Malloch, *Ent. Mo. Mag.*, February 1906, p. 41. Fifty-nine species recorded as new to the Clyde list.

ON THE BRITISH SPECIES OF HYDROTÆA, DSV. (*continua*). Percy H. Grimshaw, F.E.S., *Ent. Mo. Mag.*, January 1906, pp. 8-11. Scottish localities for *H. armipes*, *albipuncta*, and *militaris* are given.

THE BDELLOID ROTIFERA OF THE FORTH AREA. James Murray, *Proc. Roy. Phys. Soc. Edin.*, vol. xvi., p. 5, pp. 215-229, with plate. Records 53 species, one of them new to science, all from material collected by Mr. W. Evans during 1905.

A CATALOGUE OF LAND, FRESH-WATER, AND MARINE CRUSTACEA FOUND IN THE BASIN OF THE RIVER FORTH AND ITS ESTUARY. Thomas Scott, LL.D., F.L.S., etc. Part I., with map, *Proc. Roy. Phys. Soc. Edin.*, vol. xvi. p. 4, pp. 97-190. A very useful paper.

BOTANY.

NOTES ON BOTANY IN THE UNIVERSITY OF GLASGOW IN THE EIGHTEENTH CENTURY. By Professor F. O. Bower, Sc.D., F.R.S. *Trans. Nat. Hist. Soc. Glasgow*, 1903-4 (N.S.), vii. pp. 121-136, pls. 3 and 4.—A series of extracts from the records of the University from 4th July 1704 to 12th May 1818 relating to the Botanic Garden, a short account by Professor Bower of results of his investigations, and a "Syllabus of Lectures" by Professor Hamilton, probably in the latter third of the century.

METEOROLOGICAL NOTES AND REMARKS UPON THE WEATHER DURING THE YEAR 1903, WITH ITS GENERAL EFFECTS UPON VEGETATION. By James Whitton. *Trans. Nat. Hist. Soc. Glasgow*, 1903-4 (N.S.), vii. pp. 154-169.

REPORTS OF EXCURSIONS (of Natural History Society of Glasgow, *Trans. Nat. Hist. Soc. Glasgow*, 1903-4 (N.S.), vii. pp. 189-196) to Cadzow, West Kilbride, Bute, Inverkip, and the Cloch, Castlemilk, Heads of Ayr and Auchemade.—Numerous fungi and a few other plants are named as found, and dimensions of trees at Cadzow are stated.

PROCEEDINGS OF THE SOCIETY, *Trans. Nat. Hist. Soc. Glasgow*, 1903-4 (N.S.), vii. pp. 197-211.—Various botanical notes, including (p. 203) four Mycetoza new to Clyde area from Strathblane and Campsie Glen.

A COMPARATIVE STUDY OF THE DOMINANT PHANEROGAMIC AND HIGHER CRYPTOGAMIC FLORA OF AQUATIC HABIT IN THREE LAKE AREAS OF SCOTLAND. By George West. *Proc. Roy. Soc. Edin.*, xxv., 1905, pp. 967-1023, pls. 1-55, with 110 photographs characteristic of lochs in areas of Loch Ness, island of Lismore, and coast from Nairn to Culbin Sands. A very important contribution to the subject.

FRENCH AND GERMAN VIEWS OF BRITISH RUBI. By W. Moyle Rogers, F.L.S. and E. F. Linton, M.A. *Journ. Bot.*, 1905, pp. 198-205.—Discusses the nomenclature employed by Dr. Focke in Ascherson and Graebner's *Synopsis der Mitteleuropäischen Flora*, and should be consulted by all British students of *Rubus*.

NOTE ON KÆLERIA. By Rev. E. S. Marshall, M.A., F.L.S. *Journ. Bot.*, 1906, pp. 103-104. Note *K. gracilis*, Pers., from Sands of Barry in Forfar; and *K. britannica*, Domin., *f. major*, from Thurso.

NEW OR CRITICAL BRITISH MARINE ALGÆ. By E. A. L. Batters, LL.B., F.L.S. *Journ. Bot.*, 1906, pp. 1-3, pl. 475. Several of those mentioned were found near Berwick-on-Tweed.

BOOK NOTICES.

THE BIRDS OF TUNISIA: Being a History of the Birds found in the Regency of Tunis. By J. I. S. Whitaker, F.Z.S., M.B.O.U., etc. London: R. H. Porter, 1905. Two vols. super royal 8vo, £3:3s. net.

Mr. Whitaker's "Birds of Tunisia" is the most important contribution to the ornithology of the Western Palearctic Region that has appeared for many years. The ornithology of the regency is one of extreme interest, especially to European naturalists, for whom it has attractions by reason of its geographical position and faunal relationships. It is fortunate that during recent years much has been added to the little that was previously known regarding it—thanks mainly to the researches of the author, Dr. Koenig, and Von Erlanger,—so that now, through these handsome volumes, we know more about the avifauna of Tunisia than we do of a number of European states.

Not only has Mr. Whitaker made a special study of the literature of his subject, but he has undertaken extensive journeys in the regency for the purpose of making himself familiar with the country and its bird-life. Thus we have a strong personal element running through the volumes in the shape of excellent field and other observations, which adds much to their attractiveness, and renders them eminently readable. This first-hand knowledge, too, has enabled the author to offer some valuable remarks on the varied physical characteristics of the country, and their bearings upon its bird-life. From these, and a general study of the volumes, it is manifest that Tunisia is a particularly interesting field for the study of subspecific forms, and for their correlations with natural causations. His remarks, too, on the necessity for protective coloration among the Chats and other species are most instructive. The total number of species and subspecies included in the avifauna is no less than 365, all of which are shortly described, and some useful synonymy and references to literature afforded concerning them. In treating of them Mr. Whitaker makes allusion to their presence or absence in the adjacent countries of Algeria, Morocco, and Tripoli, etc., and offers some useful observations thereon. In addition to its native birds, Tunisia offers a winter retreat for many species

which have their summer quarters in northern and central Europe, while others traverse it on their passage northward in spring, and southward in autumn.

A few words are especially necessary concerning the get-up of the book. In this respect the volumes leave nothing to be desired, indeed they are sumptuous, being finely printed, elegantly bound in half morocco, and illustrated by fifteen hand-coloured plates, than which we have never seen better, two photogravures, two black-and-white reproductions of photographs, and two maps. Mr. Whitaker has indeed not only given us a work of great merit, and a valuable contribution to ornithological literature, but also one of great artistic excellence.

THE BIRDS OF THE ISLE OF MAN. By P. G. Ralfe. Edinburgh : David Douglas, 1905. Price 18s. net.

Situated in the middle waters of the northern section of the Irish Sea and almost equidistant from England, Scotland, Ireland, and Wales, the Isle of Man occupies a singularly interesting geographical position from the faunist's point of view, and this, together with its limited area (some 230 square miles) renders it an ideal spot for the activities of the naturalist investigator. The island, too, has a varied surface, and thus affords a considerable choice of bird-haunts; while last, but far from least, it is known to lie in the course of important and varied streams of bird-migration.

The strong point in Mr. Ralfe's volume is to be found in his historical and other bibliographical researches, and in these respects, and in its statistical and descriptive aspects, the book is decidedly an excellent one. On the other hand, however, his personal knowledge of Manx ornithology is unfortunately not masterly. He appears to know nothing regarding the important subject of migration as observed in the island, which is most disappointing. Such inquiries into this interesting phenomenon as that lately carried on under the auspices of the British Association can only result in the laying down of broad lines, and we must look to competent local ornithologists to fill in the various details, which can be known to them alone. Thus it is greatly to be regretted that Mr. Ralfe is unable to contribute, even in a small degree, towards this furtherance of our knowledge from so favourably situated an Island as that of Man. This lack of personal experience, too, is manifest in the accounts of several species. Regarding the Twite, for instance, our author seems to know nothing, and he merely quotes the few words of Mr. Kermode without comment, and thus he leaves us somewhat uncertain as to the present status of this bird as a Manx species.

The Avifauna is interesting rather than rich. It comprises 183 species, of which 93 are native or breeding birds. As the historian of these, Mr. Ralfe deserves our congratulations on the manner in which he has accomplished his self-imposed task. The resultant

volume, despite the shortcomings alluded to, is a useful one, and is nicely got up—a credit to publisher and printer alike. It is illustrated by fifty black-and-white reproductions of photographs of Manx scenery and bird-haunts, and there are also two useful and excellent maps.

AMERICAN INSECTS. By Vernon L. Kellogg. (London: Archibald Constable and Co., 1905).

This work, which can be had for the very moderate price of one guinea, is a handsome octavo volume of 674 pages, with 13 well-executed coloured plates and no fewer than 812 illustrations in the text. It is divided into eighteen chapters, with an Appendix and a carefully compiled Index. The first three chapters are of an introductory nature, extremely well written and forming a most useful summary of facts connected with the anatomy, physiology, life-history, and classification of Insects in general. Then follow twelve chapters dealing with the various Orders, commencing with the Springtails and Bristletails and leading up to the very specialised Wasps, Bees, and Ants. Each order is treated with a great amount of detail, analytical keys being given to the principal groups, while the general appearance and habits of the principal North American representatives are described in a remarkably lucid and interesting manner. In this section of the work the illustrations are, in the main, excellent, the line drawings being, in our opinion, much superior to the process-blocks, which in some cases are uneven and blotchy. The coloured plates are executed by three-colour process and are, on the whole, good examples of this art. The concluding chapters will no doubt appeal to a large class of readers, since they treat of such fascinating subjects as Insects and Flowers, Colour and Pattern and their uses, and the relations between Insects and Disease. Altogether the conception and execution of the work are excellent, and we should much like to see a similar work on the insects of this country. It is just such a general introductory volume as is needed by the youthful entomologist, giving him a thoroughly useful and reliable groundwork and fitting him for future development as a specialist. Even to the ordinary nature-lover it should prove an attractive book, and we can cordially recommend it to our readers.

THE BRITISH FRESHWATER RHIZOPODA AND HELIOZOA.—By James Cash, assisted by John Hopkinson, F.L.S., F.R.M.S., etc. Vol. I. Rhizopoda, Part I. (London: The Ray Society, 1905.)

This volume is the first instalment of what will prove to be a monograph of great value to students of the lowest forms of animal life to be found in our Islands; a treatise on which has been a desideratum in the literature devoted to the exposition of the British fauna. The introductory section deals with the Rhizopoda generally, their structure, means of locomotion, food, reproduction, distribution, and methods for their collection and preservation. This is followed

by the consideration of the classification of the sub-class, and its division into orders, families, and genera ; accompanied by diagnoses. Finally, we have the main or systematic portion of the volume treating on the various British species, and giving for each its full synonymy (the preparation of which is the work of Mr. Hopkinson), description, distribution, etc. Every species is figured, there being a series of 16 excellent plates, mostly coloured, from drawings by Mr. Cash. The Ray Society is to be congratulated on having secured Mr. Cash's services for such a desirable work, and its authors on the thorough manner in which they have accomplished it.

BRITISH DESMIDIACEÆ, VOL. II.—By W. West, F.L.S., and G. S. West, M.A., F.L.S., being one of the volumes issued for the year 1905, to members of the Ray Society.

This monograph is worthy to rank with the many admirable contributions to Botany and Zoology that have been issued by the Ray Society, and worthy also of the high reputation of its authors as experts in the study of the Freshwater Algæ in the British Islands. The first volume was issued in 1904, and there will be others to follow.

Texts and plates are alike in the care expended on them and in their accuracy. The second volume includes the genera *Euastrum* (46 species), *Micrasterias* (19), and *Cosmarium* (50), and varieties appear under many of the species. For each species or variety, after the name and reference to the plate on which it is figured, there follow an excellent bibliography and synonymy, a full description, a statement of the distribution in our islands and abroad, and frequent critical notes. For each genus a key is supplied to aid in identification of the species. No better or more useful monograph of these very interesting plants could be desired.

THE ALIEN FLORA OF BRITAIN.—By Stephen Troyte Dunn, B.A., F.L.S., Superintendent, Botanical and Afforestation Department, Hongkong. (West, Newman and Co., 54 Hatton Garden, London, 1905.)

For three or four years before going to Hongkong, Mr. Dunn had devoted his spare time, while residing in Kew and employed in the Royal Herbarium, to accumulating information about the occurrence of alien plants in Britain. To render that information useful to others he has arranged the plants to which it refers under their families, these following the order of succession familiar in English works. The arrangement within each family is alphabetical. The interruption to the collection of materials caused by the departure from England, and the conditions under which the materials had to be prepared for publication, away from the means of verifying doubtful points, or of filling in gaps, have necessarily interfered seriously with the completeness of the book ; but it contains much of great interest, and forms a store of helpful information. Mrs. Dunn deserves thanks for her share in rendering that store accessible to others.

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[JULY

WHITE-SIDED DOLPHIN (*DELPHINUS ACUTUS*) FROM THE COAST OF SUTHERLAND.

By Sir WILLIAM TURNER, K.C.B., F.R.S., Etc.

EARLY in April of this year a dolphin was stranded on the coast of Sutherland, about half a mile to the east of Dunrobin Castle, where a streamlet entered the sea. The attention of the Rev. Dr. Joass was called to the animal by one of the Duke of Sutherland's keepers, and Dr. Joass arranged that it should be sent to me, for the Anatomical Museum of the University of Edinburgh. The dolphin arrived in excellent order, and proved, on examination, to be a specimen of the species originally named by Dr. Gray, *Delphinus acutus*, though subsequently termed *Lagenorhynchus acutus*, or *L. leucopleurus*, the white-sided dolphin. The specimen was a female, 6 feet long. Its characters were described by me to the Royal Society of Edinburgh on 4th June, and an account of it, with figures, will appear in the "Proceedings" of the Society.

WHALING IN SCOTLAND.

By R. C. HALDANE, F.S.A. (Scot.).

PLATE IV.

IN the "Annals of Scottish Natural History" for April last year I contributed a paper on "Whaling in Shetland." The results of the season of 1905 are now before me, and are as follows—

	<i>B. musculus.</i>	<i>B. sibbaldii.</i>	<i>B. borealis.</i>	<i>Megaptera.</i>	<i>Sperm.</i>
Norronea Co. . .	73	...	2
Shetland Co. . .	48	...	3
Alexandra Co. . .	87	1
Olne Co. . .	164	5	27	5	1
	<hr/> 372	<hr/> 6	<hr/> 32	<hr/> 5	<hr/> 1

The Olne station had also a Bottle-nose whale (*Hyperodon rostratum*) of 14 feet. To these must be added the returns from the Buneveneader station, Harris, kindly supplied by Herr Herlofson to Mr. Harvie-Brown, viz. 78 *B. musculus*, 31 *B. sibbaldii*, 2 *B. borealis*, 1 *Megaptera*, and 4 Sperm whales. In 1904 this station got 37 *B. musculus*, 42 *B. sibbaldii*, 4 *B. borealis*, 5 *Megaptera*, and 5 Sperm whales.

In Shetland in 1903 two *B. sibbaldii* were seen, at the close of the year, travelling south at a great pace. In 1904 none were got. This year 6 were killed by Shetland boats, but contrast this with the 31 *B. sibbaldii* killed off Harris this year, and 42 last. It affords some evidence as to the migration of these whales. They appear to keep well off the coast of Harris and steer straight for Iceland. Then, again, this one station in two years killed nine Sperm whales, whereas in Shetland waters only three of these whales have been killed in as many years. This is a matter of great interest, since it shows that Sperm whales during their northern migration keep considerably west of the Hebrides, and their presence in Shetland waters is, in all probability, only accidental. What adds greater interest to the returns of Herr Herlofson is that the Sperm whale killed on 23rd June was a cow, 57 feet long and 37 in girth. Hitherto it has been generally held, that Sperm whales occurring in



HEAD OF *B. MUSCULUS*, SHOWING COLOURING OF BALEEN.



BALEEN—(1) *B. SIBBALDII*; (2) *B. MUSCULUS*; (3) *B. BOREALIS*.

these northern seas were always males,¹ but this proves that cows do come north, but certainly very rarely. I will, however, allude to Sperm whales later on.

BALÆNOPTERA MUSCULUS.

The returns from the stations for this species killed in 1905 are interesting.—

STATION.	Number of Bulls killed.	Average Length.	Number of Cows killed.	Average Length.	Proportion of Bulls per cent.	Proportion of Cows per cent.
Norrone . .	42	61.3	31	61.9	57.5	42.4
Shetland . .	24	62.6	24	65.1	50.0	50.0
Alexandra . .	56	60.9	31	64.7	64.3	35.6
Olna . . .	81	58.2	83	58.4	49.3	50.6
Buneveader	45	60.7	33	60.2	57.6	42.3
	248	60.5	202	62.0	55.7	44.1

To get at the average length of the adult whale, I last year deducted from the total all whales under 56 feet as immature, which will give us for 1905:—

Average of bulls, 62.2 feet. Average of cows, 64.0 feet.

Against 1904—

Average of bulls, 62.9 feet. Average of cows, 66.0 feet.

The largest whales killed at the stations in 1905—

Norrone . .	Bulls, 70, 80, 70, 70, 70.	Cows, 80, 70, 70, 70, 70, 77.
Shetland . .	„ 67, 66.	„ 68½, 69, 71, 71, 72, 70.
Alexandra . .	„ 70, 67, 67.	„ 70, 70, 70, 72, 75, 72.
Olna . . .	„ 65, 66, 66, 68, 67, 68.	„ 69, 69, 69, 70, 69.
Buneveader	„ 70, 76, 77, 71, 70.	„ 70, 76, 77, 72, 72.

The bulls killed this year seem to be of unusual length. The monster of 80 feet I was told was the largest Finner bull whale the Norwegians had ever seen, the girth was estimated at 36 feet. The cow of the same size was equally gigantic and contained a foetus of 2 feet 3 inches long. In June, about fifty miles north of Shetland, I saw a school of four whales, of which one of 65 feet was killed, but there was one much larger which escaped. It was certainly 10 feet longer than the one we got, and of far greater bulk.

The girth, or estimated girths, of these whales varies greatly, according to the condition of the whales. One station gives bulls of 76 and 77 feet each, 35 feet in girth; one of 70 feet, 34 feet;

¹ See “Encyclopædia Britannica.” Article on ‘Whales.’

60 feet, 29 feet; 62 feet, 37 feet; 66 feet, 31 feet. Another station one of 65 feet, 27 feet; 60 feet, 27 feet; 60 feet, 24 feet; 70 feet, 28 feet. While a cow of 77 feet was 36 feet in girth, contained a foetus of 4 feet, and was in milk. The last is of interest as the milk could not be for the unborn foetus, but must have belonged to a calf nearly weaned, which seems to show that, like the domestic cow, a cow may be in-calf and yet giving milk to an older calf.

The smallest foetus I have seen was about 5 inches long, and belongs to Principal Mackay, M.D., of Dundee University. I got another about 7 inches long, and sent it to Dr. Harmer of Cambridge University. The growth of the foetus from this stage must be very rapid. One of 13 feet 6 had signs of baleen in the gum. Last year Mr. Harvie Brown gave an account of twin foetuses in a *B. sibbaldii* cow. Twins were found in a *B. musculus* in 1904 at Faroe, and in 1903, Captain Castberg of the Norrona station, also found twins of small size in a *B. musculus*.

DISEASES, ETC.

On 12th June there was a bull Finner at the Alexandra station 60 feet long, which had a tumour 4 feet 3 inches in length, 16 inches wide, and 11 inches deep. The matter was decomposed but not otherwise offensive. Captain Castberg once got a Finner which had two vertebrae of the back joined together and much decayed.

Herr Föden, at Ronas Voe, got a Finner 75 feet long, which only yielded half a barrel of oil. The blubber was hard and dry, and contained no oil, the whale had a bad smell, and was evidently ill, probably from old age. At the Alexandra station on 26th May, I took four specimens of *Pennella balenopterae*¹ from the back of a cow whale. These were about seven inches long. I came across another whale (Finner) with two or three bushels of Nematode worms in the stomach.² This is the first time I have found internal parasites in a whale.

I took the temperature of a Finner whale just under the blubber, it had been dead for eighteen hours, and was 85° Fahr.

FOOD.

I last year pointed out that Finner whales only eat herrings when shrimps are not to be got. My observations this year confirm this. At the Olua station the only two whales fed on herrings, which are recorded, were got on 31st August, and these I happen to know were got north-east of Shetland. The Shetland station

¹ See "Trans. Roy. Soc. Edin.," vol xxi. part ii. No. 18.

² I am indebted to Dr. Harmer, University Museum of Zoology, Cambridge, for telling me these have been determined by Dr. Von Listow as *Ascaris simplex*, a species which also occurs in the Porpoise (*Phocaena communis*).

on 1st July got one with herrings inside, and from 28th July to 3rd August four with herrings. The Norrona station on 8th June got a whale with herrings, mackerel, and a dog-fish of two and a half feet in length. On 19th July small herrings in one was reported, and on 12th August another had fed on herrings. At the Alexandra station the whales were entirely fed on shrimps till 24th June, when one was got with herrings, but from 25th July to 3rd September 21 were more or less fed on herrings. Some of the herrings were of most unusual size, larger than any the Norwegians or I had ever seen, full fish, that is, unspawned. But to the north-east of Shetland, far from land, the whales had also fed on "small white fish like whiting but thinner." This was also remarked at the Olna station. It was also noted that at Iceland in 1904 whales were scarce, in 1905 they were plentiful. At Shetland in the latter part of August 1905 whales got scarce evidently because their chief food, shrimps, were scarce, and they had to go farther away for them. Until we get fuller information about the temperature of the currents in these seas, and scientific dredging carried out by competent men, I fear we shall never know more than the fact that, when the food of whales becomes scarce, they wander long distances in search of it. This would not only throw light upon the migration of whales, but also upon the migration of herrings.

GENERATION, ETC.

A year ago I was asked by a distinguished authority on whales, to try to find out how whales generated. Experienced whalers told me they had seen two whales come together and splash with their tails, but could not say what took place. At last the master of a whaling steamer told me, he was convinced he had seen the act of coition. He was following three whales all swimming together. Suddenly the one in the middle turned to the whale on her right side, and both turned over on their sides close together on the surface of the water, and splashed with their tails. All was over in a few seconds, and the cow gave two loud grunts and was shortly after shot. Another question I was asked was, how does the calf with its projecting under-jaw suck the mother? This is more easily answered. The calf swims alongside the mother and takes the teat in the corner of its mouth and sucks thus. The teat is so short, for the size of the animal, about five inches, that the difficulty is obvious. One whaler thought the cow had the power of ejecting the milk into the mouth of the calf. But in a rough sea this could not happen, and the first seems to me the only possible way.

All the Norwegians agree that these whales copulate and breed at any season of the year; in this they differ from the Greenland Right Whale, which I am told on excellent authority, always produces its young during the first three months of the year, the

period of gestation being about nine months. I am, however, inclined to think that most Finners give birth to their calves in the latter part of the year. I am informed of one curious case. A Finner cow, dead for several hours, was drawn up on the slip to be cut up. As soon as it reached the place where it was to be flensed, it gave birth to a dead calf, 17 feet long, with the small blades of baleen showing clearly above the gum.

Two most experienced managers of whale stations in Iceland, Norway, and Shetland assure me that the *B. musculus* and *B. sibbaldii* never cross, and that they have never seen a so-called "Bastard whale."

BALEEN.

There is considerable variation in the number of plates in the jaw. In 1904 I found 375 plates on one side, in 1905 I counted 388 plates. The whale was lying on its left side, as in the illustration. The first anterior 120 plates were yellow and had no grey markings, the next 50 showed slight grey lines, thereafter the plates become more and more grey, till the posterior plates are quite grey. The plates on the *right* side of the anterior part of the jaw are yellowish-white, but on the *left* side they are almost always grey. It is very hard to understand why this should be. I can only conjecture that it may have something to do with the feeding of the whale. In feeding, the whale lies on its side and swims in circles sucking in its food. Is it possible that the light colour of the right side of the whale is adapted by Nature for attracting the food? Or, if the whale feeds only on its left side, that the light affects the colour of the anterior plates on the right side? Or is the colouring just a freak of nature? The lower jaw, as the illustration shows, projects considerably. A little below the top there is a double row of hairs, about twelve in a row. The upper jaw has no hairs for three feet from the snout, then there is a double row, about one foot apart, to beyond the blow-hole.

COLOUR.

Seen in the water, and I have been within twenty yards of different whales, the colour of a whale appears to be black. When killed it proves to be a very dark grey, which shades gradually into a steel grey, and below the median line it fades off into white. The colouring, however, varies in different individuals, some appear to be lighter, and others darker.

BALÆNOPTERA SIBBALDII.

The Alexandra station got one Blue whale in 1905, a cow of 63 feet containing a foetus. The Olna station had five, and the

Bunevenader station thirty-one, 18 bulls and 13 cows. The average size works out—

Alexandra	.	.			Cows	1, 63.0 feet.
Olna	.	:	.	Bulls	1, 52.0 feet.	„ 4, 59.4 „
Bunevenader	.	.		„	18, 70.2 „	„ 13, 71.6 „

The average girth given at Bunevenader was 31.7 feet, in both sexes. This varies greatly. A cow of 79 feet being 40 feet in girth; cow of 78 feet, 41 feet; cow of 75 feet, 40 feet; cow of 80 feet, 38 feet. The bulls range from one of 75 × 41 feet, 77 × 41, 88 × 38, 80 × 42, to one of 59 × 17 feet.

These figures are of interest as they show that in length and girth Blue whales are larger than Finners. The greatest girth of one of the latter given in my notes was 40 feet.

Blue whales, as a rule, seem to frequent these seas mostly in July and August.

The baleen plates of these whales are black. The one photographed is 29 inches long, or 35 inches to the end of the hairs, with a width of 14 inches.

Blue whales are said not to be fish-eaters, their chief food being a small grey crustacean “like sawdust.” Although these are so small, yet, I am informed, they can move against a seven-knot current.

In 1904 27 bulls and 15 cows were killed at Bunevenader. The bulls averaged 69.7 feet, the cows 69.3 feet. The largest bull was 74 feet, the largest cow 75 feet.

PHYSETER MACROCEPHALUS.

Of the Sperm whales or Cachalots, three bulls killed at Bunevenader, the lengths of which were 49, 55, and 50 feet, if we add to them the Olna bull of 58 feet, the average length is 53 feet. The Bunevenader cow was 57 feet in length. I have no record of the food of these Harris whales, but in 1904 one was got with a large shark hook about 9 inches long in its stomach. The Olna Sperm whale had been living on small sharks, and had a number of quite small cuttle-fish beaks in its stomach.

I have already mentioned the cow Sperm whale got by the Bunevenader Company. It is a fact worthy of record.

The largest bull Sperm whale killed in Scottish waters, so far, is the Norrona bull of 1903, which was 68 feet long. The Bunevenader bulls of 1904 were 55, 56, 59, 50, and 55 feet long, an average of 55 feet.

BALÆNOPTERA BOREALIS.

In Scotland and Shetland during the season of 1905, 34 Rudolphi's Rorqual were killed. The largest bull was 47 feet long,

the longest cow 46 feet. The average size works out—18 bulls, average 39.9 feet; 16 cows, average 40 feet.

The value of the whalebone of this species has greatly increased, I am told, being now worth £300 a ton. From the small size of these whales the oil obtained is not worth as much as the yield from the larger *Balænoptera*, but the value of the whalebone probably makes up for this. This is not fully recognised by the whalers, who sometimes refuse to fire at the *Seihval* (the Norwegian name for this species) in case they disturb Finners. The baleen of these whales is naturally smaller than the Finners. A blade before me measures 25 inches by 8 inches. It is black with a fringe of white hairs. The length, including the hair, is 29 inches. At the smaller end there is one line of white.

One of the *Seihvalen* killed at the Olna station in 1905 had curious baleen. Instead of being black it is marked longitudinally, for half the breadth, with pale yellow-grey bands. The manager told me he had never seen anything resembling it before. The hair fringing the baleen of this species is exceedingly fine and soft.

MEGAPTERA LONGIMANA.

I have only the measurements of six Humpbacks killed in Scottish waters. Five at Olna and one at Bunevenader. Four bulls averaged 36.2 feet, 2 cows averaged 40 feet. They are compact whales, heavy for their length, and in shape more resembling the Right whale. They are very fierce, and dangerous when wounded, using their long flippers with great effect as a weapon of offence. The Norwegians will not venture off in a boat to spear them when harpooned, saying they are "fighting whales." I have been told of three men who went in a boat to lance a harpooned one. When the boat got near it brought its huge flipper down on the boat, cutting it in two, and killing two men. The third drifted off on the stern of the boat and was saved.

WHALE PRODUCTS.

When the blubber is taken off the whale to be boiled down into oil, the baleen is cut out of the jaw. The carcase is then drawn to the other side of the slip, where the flesh is cut off, with large flensing knives, and carried by a chain of buckets to the first floor of the boiling-house. Here it is emptied into huge vacuum pans and boiled by steam for several hours. The boiled flesh is then removed by the manhole. It resembles spent tan bark. It is now wheeled to another series of buckets, which carry it up to the top of the dessicator, a big cylinder of brick-work, with large iron trays which revolve slowly, the meat dropping from one to another, the

whole being heated by a furnace of coke. When the flesh reaches the ground it is quite dry with little smell, and dogs eat it readily. Again it is taken up in buckets to the top of a mill, in which it is ground and is run off into sacks. It now resembles pale brown snuff, and is used in Scandinavia for feeding cattle. The refuse passes out another way, and, along with boiled and ground bones, is used for manure. The products of an average-sized whale consist of 3 tons cattle food, and rather over a ton of manure, the commercial value being about £30. The manure is of most excellent quality, but cattle in Scotland do not at first take kindly to the flesh, though it greatly increases the yield of milk and butter; however, the flesh is worth as manure about as much as it is worth as cattle food. The blood which runs out when the whale is cut up flows into a tank, the oil is extracted and the refuse is treated as manure. Thus the whole of the immense carcase is utilised.

In Shetland the benefit to the local people is great. When the deep-sea white fishing, called the "haaf," ceased, there were a number of men who used to fish from "sixerns," or six-oared boats, who were too old to go to the herring fishing, and who had no other work to do. The whale stations give them work, and pay good wages. At the Alexandra whale station about thirty are employed, and receive over £500 a year in wages, and at Olua still more—a great help in poor districts.

The baleen goes to Paris, where it is used for stiffening ladies' corsets, making artificial osprey feathers, stuffing for mattresses, and also, it is said, for making into hair for barrister's wigs, brushes, etc.

The meat of a young whale, say of 50 feet long, lately killed, and kept in vinegar for a day, is food not to be despised. It is tender as veal with the richness of pork. Dressed by a good cook it is a fair substitute for veal cutlets. It is also made into rissoles. The Norwegians like it cut as thin steaks and fried with onions. Well cooked, hardly anyone would know that it was not very tender veal or pork.

OLLABERRY, SHETLAND.

SOME RARE BIRDS FROM SCOTTISH STATIONS.

By W. EAGLE CLARKE.

DURING the past spring the Scottish Light Stations have been visited by an unusual number of interesting migratory birds, specimens of which have been forwarded to me for identification. Several of these are deserving of special

notice on account of their rarity, while the others will add considerably to the value of the Report for 1906.

RUSTIC BUNTING (*Emberiza rustica*).—Foremost among the rarities, from the Scottish point of view, is an adult male of this species in full summer plumage which appeared at Cape Wrath on the 11th of May. This bird is not only an addition to the fauna of Scotland, but its occurrence is additionally interesting since it is the first of its kind which has been known to visit Great Britain during the spring time. The other British specimens, some four or five in number, have occurred in the Eastern and Southern counties of England, and during the autumn. This Scottish example had possibly passed the winter with us; and when it came to grief at the northern extremity of our mainland, was probably on its return journey to the summer home of the species in North-eastern Europe, or perhaps Siberia. From its western native haunts the Rustic Bunting does not seem to migrate to any far removed winter quarters, for it is only as a straggler that it occurs in Central or Southern Europe; but the Northern Asiatic birds migrate regularly to cold weather retreats in China and Japan.

DESERT WHEATEAR (*Saxicola deserti*).—A male in full summer dress occurred at the Pentland Skerries on the 2nd of June. This appears to be the fourth known occurrence of this species in Great Britain and the third for Scotland. That this southern bird should have been detected in Scotland in most of these chance visits to Britain is remarkable. It is not known to be a native of Europe, but has its home in the arid districts of Northern Africa, the Soudan, Arabia, Palestine, and the western portion of Central Asia. In winter it is to be found in Northern India, Baluchistan, etc. Its occurrences on the continent of Europe are few, and appear, so far as they are known, to have been confined to Heligoland, where it has come under notice on three occasions. Hitherto all the British examples have been obtained in the autumn, and only one of the Heligoland birds was captured in the spring. It is quite impossible to account for the appearance of this bird in localities so very far removed from its native wilds, especially

as it does not seem to undertake extensive migrations, and in its western or African habitats, which are those lying nearest to our shores, is a sedentary bird.

ORTOLAN BUNTING (*Emberiza hortulana*).—On the 1st of June a number of Ortolan Buntings arrived at Fair Isle, along with sundry other migratory birds, and three specimens—two males and a female—were sent me. This species has only been observed as a visitor to Scotland on a few previous occasions, but may occur more frequently on our coasts and those of Eastern England during the periods of passage than is suspected, for it has a high northern summer range in Scandinavia. Its main lines of flight are, however, along the western coast of the Continent, and it occurs at Heligoland in large numbers on both the spring and autumn passages.

ASIATIC SKYLARK (*Alauda arvensis cinerea*).—Last, but not least in interest, is the occurrence of this Asiatic race of the Skylark at the lantern of the Flannan Islands lighthouse on the 24th of February. This form was described by Ehmcke in the "Journ. für Ornithologie" in 1903 (p. 149), as *Alauda cinerea*, and is the *Alauda arvensis cinerea* of Dr. Hartert's "Vögel der paläarktischen Fauna" (p. 247). This capture well illustrates the advantage that accrues from a knowledge of racial forms, since it enables us to determine the areas whence came this remarkably grey skylark to our shores. It has not hitherto been detected in Europe, except in the far East, but, according to Dr. Hartert, it has its home in Western Siberia, Turkestan, Persia, and possibly in Palestine; and in winter is found on the northern side of the Caucasus, Egypt, Tunis, and Algeria. This bird was submitted to me for determination by Mr. George Girdwood, of Dumbarton, and I have to thank Mr. Rothschild and Dr. Hartert for facilities and assistance which rendered this end possible by a comparison with specimens in the unrivalled collection of Palæarctic birds in the Tring Museum. Mr. Girdwood has most kindly presented this interesting specimen to the collection of birds in the Royal Scottish Museum, where I may remark all the birds here treated of have also found a most appropriate resting-place.

REPORT ON SCOTTISH ORNITHOLOGY FOR 1905.

By JOHN PATERSON.

AN examination of the details in the following pages relating to the observations made throughout Scotland in 1905, which are set out as usual in specific order, will convince the reader that a great amount of systematic attention is being paid to the ornithology of Scotland by lightkeepers and observers on the mainland. It may be argued that those interested appreciate this report, and find it a convenience, from the ready support extended to the compiler, the reports being more numerous this year than last year, and in detail much more full. Only a small portion of the information submitted appears here, but it is hoped that none will be discouraged from keeping their returns up to the full standard which they have in many cases set themselves this year. The difficulty of selection from the mass of information which has come to hand has been considerable, and in accepting the responsibility for what to some may seem omissions, the compiler of this digest can assure all who have contributed to make the report possible that every detail submitted has received due consideration, although that may not appear from the necessarily brief notices in many cases under species. The present opportunity is taken to impress on correspondents again, the desirability of extending the inquiry, so as to embrace all the phenomena of bird-life in Scotland to which their attention may be directed, or which may come under their observation.

Throughout the following pages reference will be found from time to time to considerable movements which took place during the year. Among them the most notable is the great rush of *Turdidæ*, Wheatears, Robins, Chaffinches, etc., which is reported simultaneously from Dunrossness and Lerwick in Shetland and the Pentland Skerries, Orkney. This "rush" followed upon a change of wind to the S.E., which took place between the 12th and 13th of April. The wind blew strongly from that quarter for five or six days,

and during that period the movement continued. Incidentally it may be observed, and indeed it will appear to some extent from what follows, with what frequency interesting movements are reported in association with S.E. winds; not a new discovery, of course, but a matter to which attention may be directed. The year gains some distinction from the observations made by Mr. Eagle Clarke in the Fair Isle during the autumn, and to them frequent reference has been made; without them the report would be incomplete. All who have sent in reports or schedules are most cordially thanked for their valuable assistance.

TURDUS VISCIVORUS (Mistle-Thrush).—Nesting birds arrived N.W. Mull on 23rd February, and were in force there on 19th March. A nest on the ground is reported from Beith—trees not far off. I heard it in fine song on 15th October at Daldowie, Lanarkshire.

T. MUSICUS (Song-Thrush).—No great movement is reported, although about two dozen appeared at North Ronaldshay on 6th November, of whom three were killed. S.E. wind and rain. At Sule Skerry, Orkney, great numbers in rays on 7th November, wind N.W. One which began singing 23rd November 1904 in E. Renfrew continued right into summer. Increased numbers are reported from Blackwood, Duddingston, and Kirkliston in the first week in February.

T. ILIACUS (Redwing).—The last mainland observation on this species is 22nd April, Stirling, about a dozen (Wm. Evans). Numbers are reported from the Flannans, Dunrossness, Aukerry, and Unst between 11th and 25th April. In autumn early mainland observations are 4th October, Aberdour, a few (Wm. Evans); 6th, Kirkliston; 7th, Beith (Ayr), three flying S.W. By the 21st they were numerous in many localities, E. and W. At Skerryvore on the 10th there was a "rush," wind W. On 1st November at same place there was a "rush" all night, wind N.E.; and at Sule Skerry, on 8th October and 7th November, there were "scores" and "great numbers" in rays respectively.

T. PILARIS (Fieldfare).—In the Glasgow district, at Frankfield, a flock of eighty was seen on 30th April. On 1st May, at Edinburgh and Burntisland, and on 5th May at Kirkliston, numbers are reported. At Pentland Skerries, Aukerry, and Unst flocks are reported on 15th and 16th April, large numbers at Balta-sound on 25th, and many at Bell Rock on 30th. In the autumn Mr. Evans saw a small flock near Balerno on 11th, and another on 14th October at North Esk Reservoir (Pentlands),

both going westerly. On 30th October, at North Ronaldshay, there were scores, twenty-two being killed. At Skerryvore, on 1st and 4th November, a "rush" is reported, wind N.E.; and on 7th, at Sule Skerry, Orkney, in a "rush" with a N.W. wind, fifteen were killed. The earliest flock reported is from Sule Skerry on 5th October, ten arriving with a N. wind.

T. MERULA (Blackbird).—From Largo one with a pure white rump is reported, and more nests than usual of this species and the Song-Thrush upon the ground were observed. In a fog at Fairlie one perched on the breach of Mr. Robert Wilson's gun! It appeared to be nesting at Helmsdale in the end of April, and at Baltasound young were hatched on 22nd May ("Ann. Scot. Nat. Hist.," 1905, p. 182). Large flocks are reported from Corsewall on 30th October, and a "rush" with kindred species at Skerryvore, 1st to 4th November.

T. TORQUATUS (Ring Ouzel).—Two remained all winter (1904-5) in the south of Arran. Earliest reports are at Lendalfoot (Ayr), 15th April; 16th, N.W. Mull (2); 19th, same locality (20); and at Halmyre (Peebles). This species shared in the "rush" at the Fair Isle on 23rd and 25th September (p. 70).

SAXICOLA CENANTHE (Wheatear).—Earliest appearances are from the mainland at Lendalfoot (Ayr), 18th March; King's Park, Edinburgh, 20th (Serle); Delny (Ross), 22nd; Beith (Ayr), same date. The first lighthouse report is from the Bell Rock, 4th April (2). Bute had its usual population on the 2nd. Reports are general thereafter till mid-May. The autumn movements are unimportant, and but a solitary entry appears in the schedules for October, when one is reported on the 1st at Crail. One can scarcely feel satisfied at the meagre reports for the species in October in last year's and this year's returns. It was still represented in the Fair Isle on 7th October, the day Mr. Clarke left (p. 69).

PRATINCOLA RUBETRA (Whinchat).—Earliest reports for this species are Halmyre (a pair), 15th April; N.W. Mull, 16th. On 26th May, at the head of the Holy Loch (Clyde), I found a nest with *seven* eggs. One near Crail, on 12th September, is the latest record.

RUTICILLA PHENICURUS (Redstart).—Earliest records are Cadder, near Glasgow, 16th April; Broughton, 19th; Kirkliston, 20th. In autumn the last dates are 9th September, Kirkliston; 23rd, Flannans (specimen received).

R. TITYS (Black Redstart).—One was sent from the Flannans on 27th June, and another on 3rd November. Yet other solitary examples of this species appeared there on 7th and 8th November, and on the 19th of the same month one is recorded

from Shapinshay, Orkney (p. 51), while on the same date one was seen at Kelvinside, Glasgow, by Mr. Wm. Wordie, who knows it in its Swiss haunts. This is a new species to "Clyde."

CYANECULA SUECICA (Bluethroat).—One at Fair Isle on 25th September (p. 21) is a new species for the Northern Isles.

ERITHACUS RUBECULA (Redbreast).—A nest in Fife which was found on 5th April, and contained then three eggs, had added another in regular course. Nothing further happened for some time, but on 21st April it was found to contain eight eggs. Immense numbers are reported from Dunrossness with a S.E. gale between 12th and 16th April, a movement which is also recorded from Lerwick, "large lot, chiefly males."

SYLVIA CINEREA (Whitethroat).—In Bute one was noted on 1st May, and the next records are Halmyre and Corsewall, 4th; Kirkliston, 5th; Greenbank, Edinburgh, 7th (Evans). In autumn 9th September, Crail; 25th, N.W. Mull.

S. CURRUCA (Lesser Whitethroat).—Reported from the Flannans on 21st May. Mr. Wm. Evans saw one on 9th September at Dunbar.

S. ATRICAPILLA (Blackcap).—Heard and seen near Edinburgh on 5th May (Evans). This was one of the best represented species at the Fair Isle in the "rush" between 23rd and 25th September (p. 20). One was shot at Inverbroom in November (p. 51), and another observed on 7th *idem* at Sule Skerry.

S. HORTENSIS (Garden Warbler).—First reported from Dreghorn, near Edinburgh, on 30th April. On 2nd June two nests with one egg each in E. Renfrew (ten days later than the first nest in this locality in 1904). Small numbers observed at Fair Isle 5th to 26th September (p. 20).

REGULUS CRISTATUS (Golden-crested Wren).—Sings at Kirkliston, 7th February. After a S.E. gale on 12th April many were seen at Dunrossness, several being found dead. On 16th and 18th April a few at Unst. From Camis Eshan, Dumbartonshire, Mr. Keith Buchanan reports a nest ready for eggs apparently, on 8th April. On 4th May it contained seven eggs four or five days incubated, so that laying did not begin till two weeks after completion of nest. Messrs. Barr and Craig, Beith, who visited Lanfine in the Irvine Valley (Ayr) in June, found three nests, and were much struck with the difference in type from that they are familiar with at Beith. The Lanfine eggs were whiter with a few dark red spots, recalling those of

the tits. The usual cream-coloured ground was quite absent. Movements are reported at various lighthouses in September (25-29) and on 28th October and 3rd November at Corsewall.

PHYLLOSCOPUS SUPERCILIOSUS (Yellow-browed Warbler).—One (♂) at the Fair Isle on 25th September (p. 21).

P. RUFUS (Chiffchaff).—Earliest reports are 25th March Lendalfoot, 26th Thornliebank (E. Renfrew), 31st Beith. Miss Fanny Anderson of Barskimming (Ayr) told the writer that in their garden, which usually harbours four pairs, not one was heard all last year (1904), which she attributed to the weather being very bad at the usual time of their appearance.

P. TROCHILUS (Willow-Wren).—Two examples of this species probably were seen on 24th March by the Rev. Mr. Gibson at Carmichael (Lanark). They remained silent while under observation. At Lendalfoot (Ayr) several were observed on 26th by Mr. Chas. Berry. The next occurrence reported is at Giffnock (E. Renfrew) on 9th April. The main body appeared generally by the 16th, when they were "swarming" in Bute, and had appeared even at Lerwick. At Beith one was seen carrying feathers to its nest after two eggs had been laid. Autumn reports are meagre—the latest, Halmyre (Peebles) 1st October, "gone." On the Fair Isle it was observed up till 4th October.

P. SIBILATRIX (Wood-Wren).—First reported from Edinburgh, 5th May (Evans).

ACROCEPHALUS PHRAGMITIS (Sedge Warbler).—At Auchinblae (Kincardine) numerous, and Halmyre (Peebles) plentiful, 29th April, Delny (Ross) 1st May, Giffnock (E. Renfrew) 6th.

LOCUSTELLA NÆVIA (Grasshopper Warbler).—Dalry (Ayr) 5th, Radernie, 12th, are the only reports.

ACCENTOR MODULARIS (Hedge-Sparrow).—Immense numbers at Dunrossness, Shetland, 12th to 16th April, with gale from S.E. Sang at Kirkliston till 16th August, and regained song 24th September.

CINCLUS AQUATICUS (Dipper).—At the Dun Moss on the road from Stewarton to Glasgow a nest and five eggs on 1st April. In September at Loch Feochan a pied variety noted. ("A.S.N.H.," 1905, p. 244).

PARUS MAJOR (Great Titmouse).—At Edinburgh sings on 21st January, and regains song 27th September.

P. PALUSTRIS (Marsh-Titmouse).—One observed Loch Awe on 29th November (p. 51).

- TROGLODYTES PARVULUS* (Wren).—Several reports from the Flannans between 7th and 20th November. In the North Glasgow district on 12th November they appeared to be everywhere.
- MOTACILLA LUGUBRIS* (Pied Wagtail).—From mid-February to mid-March generally observed migrating. Full clutch of eggs at Edinburgh on 4th May. Migrants reappear at Kirkliston 10th, Edinburgh 19th July in small numbers, very numerous at Kirkliston on 4th August. Several hundreds still roost every night in the winter, on the G.P.O., Edinburgh, as they have done for many years past—local birds (W. Evans).
- M. ALBA* (White Wagtail).—19th March, at Thornliebank, one observed by several Glasgow ornithologists and the writer. 2nd April, one at Bute. Many observations in the west after these dates, and till 20th May. The Flannans, Mull, Sule Skerry, and Fife Ness supply September occurrences. This was the only Wagtail seen by Mr. Clarke at the Fair Isle, where one was still to be seen when he left on 7th October (p. 19).
- M. RAII* (Yellow Wagtail).—15th April, Beith; 16th, Dalbeth (Lanark), are the earliest appearances. At Beith, on 23rd May, a nest and six fresh eggs.
- ANTHUS TRIVIALIS* (Tree-Pipit).—At Duddingston Manse, on 1st April, and Carmichael Manse, Lanarkshire, on 2nd April—quite exceptional occurrences if no error has crept in. At Halmyre and Beith on 22nd April, and in various other localities till 30th. Last in song at Kirkliston, 18th July. One shot Fair Isle, 30th September (p. 80).
- A. PRATENSIS* (Meadow-Pipit).—First movement 22nd February, N.W. Mull; a few, and generally observed migrating, in March. On 22nd March at Balerno and elsewhere at base of Pentlands, was returning to breeding grounds, and on 24th had returned to Carmichael (Lanark). On 12th to 16th, great numbers at Dunrossness, with S.E. gale. Singing at Glasgow, 27th. From 12th August to 11th September in flocks of varying size at Sule Skerry, Bell Rock, Kirkliston, and Flannans. At the Fair Isle till 7th October. It arrived there 11th September, and many left on 15th.
- MUSCICAPA ATRICAPILLA* (Pied Flycatcher).—After a S.E. gale on 12th April, one at Dunrossness; 16th to 18th, a few at Unst; 24th April, Thornhill (Dumfries). In Bolton Parish, East Lothian, a male, and half a mile away a female, on 11th May (H. N. Bonar). Nesting near Edinburgh ("A.S.N.H.," 1905), and Thornhill (*loc. cit.* p. 243).

M. GRISOLA (Spotted Flycatcher).—First report, 4th May, Halmyre. No report thereafter till 18th, in N.W. Mull, when one was observed uttering its feeble song. Next report is Carmichael (Lanark), 24th. Dates run late for this species this year. On the 14th June it had reached the Flannans, to which it is a new species ("A.S.N.H.," 1905, p. 244). Latest autumn occurrence, Kirkliston, 22nd September.

HIRUNDO RUSTICA (Swallow).—On the 21st March a true Swallow flew about the village of Lendalfoot (Ayr) for some time, as Mr. Berry informed me shortly thereafter. "Many" are reported as having appeared on Duddingston Loch on 7th April, but reports increase daily from the 12th at Beith; 13th, Brodick, Arran. Reported in autumn from eight localities in October between the 9th and 26th; and on 6th November one is reported by Mr. Hugh Campbell to have been seen by him on a fence at Dalmeny. Also reported from North Berwick on 12th November (W. M. Ingles).

CHELIDON URBICA (House-Martin).—13th April, several at Broughton; 14th, Pentland; 15th, various localities east and west. 23rd October, several at Gilston (Fife); 2nd November, North Berwick; 14th, one at Kirkliston, "seen at close quarters." Young still in nest, 21st September, Craighead, Fife.

COTILE RIPARIA (Sand-Martin).—Inverurie, 5th April (three); 6th, Burntisland (one); 9th, Duddingston, a good many (Evans). Generally observed between 15th and 17th. Last seen, 11th September, Edinburgh.

LIGURINUS CHLORIS (Greenfinch).—Many in Unst on 4th January (wind S.E.-E.), and a few still about 22nd April. Those nesting locally arrive in force in N.W. Mull on 3rd. On 15th from 15 to 20 arrive at Lerwick, wind S.E. On 16th built nest at Kirkliston, but did not lay till 9th May! 12th August, still in song; and 24th, young just out. 19th September, over a hundred seen in crofts in N.W. Mull. 4th December, ten at the Flannans, wind S.E.

CARDUELIS ELEGANS (Goldfinch).—7th May, a pair at Giffnock, and 30th July at Eastwood (both E. Renfrew) one adult feeding a grey young one, which was on a telephone wire (J. Robertson). Two near Gorebridge, 9th November (p. 50).

C. SPINUS (Siskin).—At Dunrossness, 12th to 16th April, after a S.E. gale, a few. In the end of October and beginning of November numbers passed over Archerfield near North Berwick. It was unusually plentiful in the Edinburgh district in November and December, and many were caught. One was sent from North Ronaldshay, 7th November, and one (out of several

seen) from Dunrossness about 17th. On 2nd December a flock at Shurray (Caithness), and several observed at Lerwick on 4th December. Observed in the Fair Isle from 24th September till 18th October (p. 16).

P. MONTANUS (Tree-Sparrow).—Forty at Crail in September, and others at Craighead Farm and St. Andrews (p. 50); small flock at Kirkliston (p. 50) on 1st December. A pair observed North Berwick, 29th October. Appeared Fair Isle, 8th September, and again 2nd October, and till 18th, when twenty-one were seen (p. 16).

FRINGILLA CŒLEBS (Chaffinch).—Reported in pairs at Edinburgh on 26th February, and as building there, and at Kirkliston on 11th and 12th April, but no eggs at latter locality till 16th May. A series of movements is reported between 29th March and 20th April, nearly all with S.E. or S. winds, from Unst, Pentland Skerries, Sule Skerry, Lerwick, Dunrossness. After the last date named the species does not reappear in the schedules till 1st October! The chief autumn reports are about forty on 8th November, and about twelve 13th November, at the Flannans. At the Fair Isle arrivals of very small numbers were noted on six occasions between 3rd and 29th September (p. 15). A partial albino (♂) observed Largo in December, "wings very white, head and body pied."

F. MONTIFRINGILLA (Brambling).—One shot in Tiree, 1st March (p. 50). A flock of fifty to sixty for the last week of March at Broughton. A flock at Kirkliston on 8th April, and one bird at Lahill (Fife), 22nd. One sent from the Flannans in the autumn. In considerable numbers at the Fair Isle as early as 23rd September, and continued quite numerous till 30th October and 3rd November, when large flocks were seen with *Turdidæ* (p. 16). Arrived at Carmichael (Lanark), where it appears regularly on 18th October. Appeared Mull, 21st November, and remained till end of year in Aros woods.

LINOTA LINARIA (Mealy Redpoll).—Three Mealy Redpolls (*sp. ?*) are reported from the Flannans, 29th October. They began to appear on 17th September at Fair Isle, numbers greatly increasing after 2nd October, and remaining so till Mr. Clarke's departure on 7th (p. 17).

L. HORNEMANNI (Arctic Redpoll).—For particulars of the addition of this beautiful species to the fauna of Scotland, readers must refer to Mr. Clarke's account of its discovery at the Fair Isle, where five examples were secured between 18th September and 10th October (p. 17).

L. FLAVIROSTRIS (Twite).—Flock of fifty at Delny (Ross) on 1st March, "first observed here." The Twite population of the Fair Isle is to be "reckoned in thousands" (p. 17).

PYRRHULA MAJOR (Northern Bullfinch).—For particulars of the addition of this species also to the Scottish fauna, reference must be made to Mr. Clarke's note on its occurrence in Shetland (p. 115). One was obtained on the Island of Fetlar on 4th November. The numerous references to the occurrences of "bullfinches" which appear in the schedules, etc., from 1st November till 3rd December at Foula, Fetlar, Fair Island, and the mainland may well apply to this species, as also those seen at Halligarth (Unst) on 16th April, which seemed larger than usual English specimens. Great numbers of "bullfinches" appeared in the garden at Inverbroom on 26th May.

EMBERIZA MILIARIA (Corn Bunting).—First arrivals at Delny (Ross), 7th February. At Falkland nest with three eggs, well incubated on 3rd August; and on 7th, at Edinburgh, young in nest. At Stronsay, Orkney, nest with four fresh eggs on 20th September (p. 51). At Robroyston, near Glasgow, on 17th November, in dense fog, with everything covered with rime, one singing—the only species in song that day.

E. CITRINELLA (Yellow Bunting).—Last in song Edinburgh, 13th August. At the Flannans on 30th October, a dozen; 5th November, eight; 12th, ten.

E. PUSILLA (Little Bunting).—One observed at the Fair Isle, 2nd October (p. 18), being the second Scottish occurrence.

PLECTROPHENAX NIVALIS (Snow Bunting).—At the Flannans, "never so few as this winter, for hundreds only an occasional straggler" (1904-5). On 10th October, at Gullane Point, a few (Evans).

CALCARIUS LAPPONICUS (Lapland Bunting).—Three at the Flannans, on 9th April, two (one shot) on 11th and one on 14th September. First heard at the Fair Isle, 7th September. In some numbers there from the 11th of September till 7th October (p. 18).

STURNUS VULGARIS (Starling).—No movements of importance, such as have been recorded from time to time, seem to have been observed this year. On 12th March, at Unst, a great many, wind N.E. In the first week in March flocks which had roosted in winter left Glenorchard, near Glasgow. At Hawkhead (E. Renfrew), still in flocks in mid-May at the great roosting-place there. Reported to be "in flocks again" in Fife by 30th May. In July Mr. John Milne counted at Auchinblae (Kincardine) 441 that roosted on a "plane" tree (as the great

maple is called in Scotland) during that month and August. On 20th September at Kilconquhar an enormous number roosted on the steeple and neighbouring trees.

CORVUS CORAX (Raven).—At the Flannans, 10th March, one; 2nd May, one; 30th August, two; Unst, 22nd April, two young flying.

C. CORONE (Carrion Crow).—Five seen in Unst on 25th February. "The first I have seen in Shetland," Dr. Edmonston Saxby writes, "though well acquainted with the species." Said to be increasing in Beith district (Ayr), where Mr. Matthew Barr got a nest with five eggs. Reported from Crail on 31st March as courting, they began building at Kirkliston on 11th, and laying on 18th April. At Largo Bay on 2nd September a constant stream of this species with a few Daws passed from N.E. to S.W. for three hours when observation ceased. Wind S.W., fresh.

C. CORNIX (Hooded Crow).—Appeared in Unst in large numbers on 4th April.

C. FRUGILEGUS (Rook).—At Edinburgh, visits old nest on 13th January and clears it out on 29th, on 27th February begins to build. At Kirkliston builds on 2nd March, lays on 20th, and young in nest on 6th April. At Unst on 4th March thirty, and several large flocks at Dunrossness after 12th April, with strong S.E. gale. Small parties at various eastern and northern stations between 6th March and 28th April. On 26th April at Thornhill (Dumfries) one seen sitting over a Mistle-Thrush's nest, picking out the young and eating them. On 2nd June a cinnamon-brown example in a flock at Ladybank.

ALAUDA ARVENSIS (Skylark).—In February, March, April, and till 2nd May frequent reports of small numbers from lighthouses. Returned to Carmichael (Lanark), 1st February. On 3rd February many little flocks at Delny (Ross) flying W. On 5th March at same place a large flock evidently arrived, the earlier arrivals singing in the fields all around. Reported as singing at Edinburgh, 26th February, also from Glasgow first burst of song from Skylarks same date. On 12th March a few at N.W. Mull flying N.W. On 26th April very plentiful all places in and outside Lerwick for a couple of miles. From 2nd May till 16th September when a very considerable increase was noticed at the Fair Isle, this species disappears from our records. On 21st September it was "very numerous" in stubbles at Kirkliston, and on 24th one was singing splendidly over the links at Prestwick. The chief autumn movements were in October. In N.W. Mull on 15th a few flying restlessly about; 16th, over 100 on crofts with Twites; 30th, over a score flying

S.W. At Largo on 21st large flocks coming in over the Firth from the south, 25th large flock, Bell Rock, with S.W. fresh breeze and haze, several killed.

CYPSELUS APUS (Swift).—Earliest reports are from Blackford Hill 5th May, North Berwick 6th, Duddingston 7th. There are reports from seven other localities between the 9th and 12th. In autumn at Dunbar on 9th September Mr. Evans saw several passing S.E. ; 14th, May Island, two ; and St. Andrews, 17th, one ("Zoologist," 1905, p. 388).

CAPRIMULGUS EUROPEUS (Nightjar).—One caught alive at Upper Pollok (E. Renfrew) on 3rd October.

IXNX TORQUILLA (Wryneck).—Three on different dates found dead early in September on the Fair Isle by Mr. Clarke. Many must have escaped notice ("A.S.N.H.," 1906, p. 70). One, exhausted, found at Sumburgh House, Shetland (*loc.* 1905, p. 244), on 2nd September. Another (♂) found dead near Stromness on 4th September. Five or six at least about Dunbar between 25th August and 9th September, one being found dead and another having been killed by a train. Also one found in a dying state at Elie on 30th September ("A.S.N.H.," 1906, p. 52). A curious record of the wreck of the Cuckoo's mate on our shores.

ALCEDO ISPIDA (Kingfisher).—One observed at Inverbroom on 12th September, and one at St. Andrews on 26th December.

CORACIAS GARRULUS (Roller).—One shot Auchmeden, near Aberdeen, 9th September ("Zoologist," December 1905, p. 466).

(*To be continued.*)

ON SOME INVERTEBRATES FROM ST. KILDA.

By JAMES WATERSTON, B.D., B.Sc.

THE present paper brings together notes dealing with groups only incidentally touched upon, or which when worked did not yield material sufficient for separate treatment.

VERMES.

CESTODA.

Cysticercus fasciolaris, Rnd., and *Tænia crassicolis*, Rnd.—In "Annals," 1905, p. 201, reference was made to a cestode parasite in the lobes of the liver of *Mus hirtensis*. The majority of the

specimens taken were in the cysticercus stage with invaginated heads, but one had apparently assumed the adult condition. Mr. A. E. Shipley, M.A., F.R.S., to whom all have been submitted, remarks that the form is peculiar "as the head evaginates and the body segments whilst still in the larval form." This interesting worm is digenetic, its earlier stages being passed in the mouse and the later in the cat. In the village itself I can remember only one cat—at the manse, a fact explained by the ubiquity of a useless breed of dogs. There are, however, a number of cats run wild on the cliffs where probably *M. hirtensis* forms some part of their diet. A full account of the literature, anatomy, and life-cycle will be found in a memoir by E. Bartels in "Zool. Jahrb.," 1902, pp. 511-570, plates 37-39.

INSECTA.

HYMENOPTERA—ICHNEUMONIDÆ. I

A month's collecting yielded only 17 specimens, comprising 9 species. These have been kindly named for me by Mr. Claude Morley, F.E.S. A Proctotrypid, a *Pezomachus*,¹ and the abundant *Myrmica rubra*, L.,¹ complete the Hymenoptera taken, and the list, in view of the fine weather enjoyed, cannot but be considered small. I was particularly anxious to test the statement that neither bees nor wasps occur on the island, but found that though many of the inhabitants knew what a bee was, their information came from books!

Alomyia debellator, Fab.—2 ♂♂, common in hot sunshine on grassy ledges, N.E. face, Oisaval. It has a sluggish, low flight. Its occurrence in July is interesting as it has hitherto been taken in May and again in September ("Brit. Ichneumons," p. 291).

Hemiteles tristator, Grav.—♂ and ♀.

Hemiteles ? *oxyphimus*, Grav.—♂.

The following four species taken by me in the island have up to the present been known in Britain chiefly from S. England (*vide* Mr. Morley's paper "Trans. Ent. Soc." 1905, pp. 419-438).

Bassus varicoxa, Thoms.—"Common in Suffolk, Cambs, etc."

Bassus (*Zootrephus*) *rufiventris*, Grav.—5 ♂♂ and 1 ♀. "Not rare, Suffolk, Lowestoft," etc.

Bassus (*Promethus*) *dorsalis*, Holmgr.—♀. "Not common, Suffolk, Surrey."

Bassus (*Homoporus*) *graculus*, Grav.—♂. "Not uncommon, Suffolk, Herts," etc.

¹ Reported on by Mr. Evans, "A.S.N.H." April 1906.

Limneria hygroptota, Holmgr.—♀.

Limneria (Angitia) fenestralis, Holmgr.—♂ and ♀.

A single Proctotrypid ♂ has been determined by Mr. Chitty to be a *Zygota*, Förster, but its identity with any described species is still uncertain.

With the exception of *Alomyia debellator*, these ichneumons were captured by sweeping in various parts of the island, but particularly in a little marshy spot at the foot of Avon Mhor. Here probably *B. dorsalis*, and *B. graculus* occurred.

LEPIDOPTERA.

At first some collecting was done in this order, but latterly it proved impossible to give it any attention. The few species detailed are therefore in no sense representative.

Vanessa urticae, L.—One seen near village.

Vanessa cardui, L.¹—August 8, 1905, one on lower slope, Oisaval, in fine condition.

Any butterflies in St. Kilda must, I think, be stragglers; occasionally one or more of our three common Pierids must visit or breed on the island, for a native had seen white butterflies. John MacGillivray ("Edin. New Phil. Jour.," xxxiii. 1842, pp. 47-70) met with *Cænonympha pamphilus*. He also records *Charæas graminis* and *Plusia gamma*.

Monima incerta, Hufn.—♂ a dark form of this widely spread species.

Scoparia sp., possibly *alpina* Stt.—But too worn for exact identification.

Eucosma Schulziana, F.—Widely distributed and not uncommon.

Elachista albifrontella.—Hb.

Endrosis lacteella, Schiff.—For this and the preceding three names I am indebted to Mr. South.

Hepialus vellea, Hb.—Common and variable, var. *gallicus*, Led.—In some numbers. Both forms from the cultivated area and round village Bay.

HEMIPTERA—HETEROPTERA.

Velia currens, Fab.—Apterous form only. In stream flowing through the Glen.

¹ Seen again by myself on Conacher, 17th June 1906.

Twice in the course of my stay the sea presented a remarkable appearance due to the presence of immense numbers of Salps. Often the receding tide left a solid jelly of these ascidians on the rocks, in pools and fissures. On the occasions referred to the water on the sheltered side of the Bay was appreciably paler for some distance out. These animals floated singly and in chains in the case of one of the two forms noted. On hot days *Ctenophores* were common in the deeper water round the islands, occasionally entering the Bay. In size they varied from $\frac{1}{4}$ to 6 or 9 inches on their longest axis. One was successfully brought back, which my friend Dr. Ashworth has little hesitation in referring to *Bere ovata*, Bosc, though it is hardly mature.

ON SOME TRICHOPTERA COLLECTED IN ST. KILDA

BY MR. WATERSTON.

By KENNETH J. MORTON, F.E.S.

Limnophilus sparsus, Curt.—Several specimens, all of them of the uniformly dusky testaceous form (*flavescens*, Steph.).

Electrocnemia geniculata, M'L.—♂ and ♀. An interesting species from such a remote locality.

Philopotamus montanus, Donov.—A series of fairly normal-looking examples in good condition.

Tinodes aureola, Zett.—One ♂.

In addition to the foregoing, there was a single ♀ of another species of *Limnophilus*, which was unfortunately destroyed on the setting-board by some unknown marauder. From the wings which alone remained, it has a strong resemblance to *L. miser*, M'L., a species which is found in boreal Europe and which also occurs in Iceland. It is impossible to be certain, but additional material from St. Kilda will easily settle the question, and this will be looked forward to with interest.

The late Mr. C. W. Dale recorded from St. Kilda ("E. M. M." xx. 214) *Limnophilus auricula*, a species which in some of its forms might be confused with *miser*. If Dale's determination is correct (which is not quite certain), the above-mentioned *Limnophilus* may be only *auricula*. I cannot think, however, that it is the latter species, the wings being somewhat different from any form of *auricula* that I have seen. Dale also recorded *Tinodes aureola* and *Polycentropus irroratus* (= *flavomaculatus*); confusion of the *Polycentropus* with the *Philopotamus* is not altogether excluded, although *Polycentropus* may exist.

DIPTERA SCOTICA: V.—THE FORTH DISTRICT (SECOND SUPPLEMENT).

BY PERCY H. GRIMSHAW, F.E.S.

MY notes on the Flies of the Forth District having now reached about a hundred additional species, I publish them without delay or comment. Some of them have been already recorded in the pages of this magazine, but for the sake of completeness and convenience it is perhaps advisable to repeat them. I have to again thank Messrs. Bowhill, Carter, Evans, Godfrey, and Waterston for allowing me to examine so much additional material from their collections.

Family PULICIDÆ.

501. *PULEX ERINACEI*, *Bouché*.—Near Edinburgh, April 1898 and May 1904 (Evans, "Annals," 1904, p. 193).
502. *PULEX GONIOCEPHALUS*, *Tasch*.—Near Edinburgh, March 1903, and Torduff, February 1904 (Evans, *l.c.* p. 194).
503. *TRICHOPSYLLA SCIURORUM*, *Bouché*.—Clubby Dean, Pentlands, March 1906; Gosford and near Dunfermline, March 1904 (Evans, *l.c.*).
504. *TRICHOPSYLLA FASCIATUS*, *Bosc*.—Dreghorn, June 1904 (*id.*).
505. *TRICHOPSYLLA GALLINÆ*, *Schrk*.—Near Edinburgh, December 1903 (*id.*).
506. *TRICHOPSYLLA GAREI*, *Rothsch*.—Loch Leven, June 1898, and Braid Hills, May 1898 (*id.*).
507. *TRICHOPSYLLA HIRUNDINIS*, *Curt*.—Liberton, August 1899 (*id.*).
508. *TRICHOPSYLLA STYX*, *Rothsch*.—Largo Links, June 1897 (*id.*).
509. *TYPHLOPSYLLA AGYRTES*, *Heller*.—North Berwick (Hon. N. C. Rothschild, "Novitates Zoologicae," v. 539, 1898. See also Evans, *l.c.*).
510. *TYPHLOPSYLLA GRACILIS*, *Taschb*.—Crosswood, Pentlands, January 1889, and Torduff, March 1904 (Evans, *l.c.*).
511. *HYSTRICHOPSYLLA TALPÆ*, *Curt*.—Logan Burn and Clubby Dean, Pentlands, March 1904 (*id.*).

Family MYCETOPHILIDÆ.

512. *MYCETOPHILA SIGNATA*, *Mg*.—Aberfoyle, 10th and 18th September 1905 (Carter).

Family PTYCHOPTERIDÆ.

513. PTYCHOPTERA ALBIMANA, *Fab.*—♀, Aberdour, 7th July 1904 (Waterston).

Family TIPULIDÆ.

514. PACHYRRHINA IMPERIALIS, *Mg.*—♂, Botanic Gardens, Edinburgh, 9th June 1904 (Waterston).

Family STRATIOMYIIDÆ.

515. MICROCHRYSA FLAVICORNIS, *Mg.*—Luffness, July 1898 (Evans, "Annals," 1904, p. 129).
516. MICROCHRYSA CYANEIVENTRIS, *Ztt.*—Balerno, 11th July 1902 (Waterston).

Family EMPIDÆ.

517. RHAMPHOMYIA ALBOSEGMENTATA, *Ztt.*—♂ and ♀, Cowdenbeath, 11th June 1904 (Waterston).
518. RHAMPHOMYIA HYBOTINA, *Ztt.*—♀, Blackford Hill, 7th June 1904 (Waterston).
519. RHAMPHOMYIA FLAVA, *Fln.*—♀, Polton, 24th June 1905 (Carter, "Annals," 1906, p. 24).
520. PACHYMERIA FEMORATA, *Fab.*—♂ and ♀, Aberlady, 25th May 1904 (Waterston).
521. HILARA TENELLA, *Fln.*—♂, Musselburgh, 17th June 1904 (Carter).
522. HEMERODROMIA MELANOCEPHALA, *Hal.*—One ♀, Aberfoyle, 8th September 1905 (Carter, "Annals," 1906, p. 24).

Family DOLICHOPODIDÆ.

523. DOLICHOPUS PLANITARSIS, *Fln.*—Seven or eight specimens, Cowdenbeath, 11th June 1904 (Waterston, *vide* "Annals," 1904, p. 223).
524. DOLICHOPUS CLAVIPES, *Hal.*—♂, Aberlady, 27th June 1902 (Carter).
525. DOLICHOPUS BREVIPENNIS, *Mg.*—♂, Aberlady, July 1898 (Evans), and 6th August 1904 (Waterston).
526. DOLICHOPUS LONGITARSIS, *Stann.*—♂, Aberlady, July 1898 (Evans).
527. ARGYRA ARGYRIA, *Mg.*—Polton, June, 1901 (Evans, "Annals," 1904, p. 128).

528. SYNTORMON ZELLERI, *Lw.*—One ♂, Aberfoyle, 8th September 1905 (Carter, "Annals," 1906, p. 24).
529. CAMPSICNEMUS SCAMBUS, *Fln.*—♂, Aberlady, August 1905 (Carter, "Annals," 1906, p. 24).
530. TEUCHOPHORUS SPINIGERELLUS, *Ztt.*—♂ and ♀, Aberlady, 7th August 1905 (Carter, "Annals," 1906, p. 24).

Family LONCHOPTERIDÆ.

531. LONCHOPTERA LUTEA, *Pz.*—Bavelaw pond, October 1903 (Evans, "Annals," 1904, p. 128).

Family PLATYPEZIDÆ.

532. CALLIMYIA AMENA, *Mg.*—♂, Glencorse, 19th August 1905 (Waterston, "Annals," 1905, p. 247).
533. PLATYPEZA INFUMATA, *Hal.*—♂, Aberdour, 7th July 1904 (P. H. G.).
534. PLATYPEZA PICTA, *Mg.*—♂, Aberfoyle, 18th September 1905 (Carter, "Annals," 1906, p. 25).

Family PIPUNCULIDÆ.

535. VERRALLIA AUCTA, *Fln.*—Aberfoyle, 30th June 1904 (Carter).
This species should have been recorded in my first list, as it is mentioned by Verrall ("Brit. Fl.," p. 75) as occurring at Aberlady.
536. PIPUNCULUS CAMPESTRIS, *Ltr.*—♂, Aberfoyle, 30th June 1904 (Carter).

Family SYRPHIDÆ.

537. PIPIZA FENESTRATA, *Mg.*—Two ♀ ♀, Corstorphine Hill, 24th May 1901 (Evans, "Annals," 1904, p. 128).
538. PLATYCHIRUS PERPALLIDUS, *Verr.*—Three ♂ ♂, Aberlady, 4th June 1904 (Waterston).
539. CATABOMBA SELENITICA, *Mg.*—One ♂, near Midcalder, 2nd August 1905 (Robert Godfrey, "Annals," 1905, p. 247).
540. SYRPHUS NITENS, *Ztt.*—One ♀, Aberlady, 25th August 1904 (P. H. G., "Annals," 1904, p. 222).
541. SYRPHUS GUTTATUS, *Fln.*—Garden, Edinburgh, 30th July and 13th August 1905 (J. W. Bowhill).

Family TACHINIDÆ.

542. *STEVENIA MACULATA*, *Fln.*—One, Aberlady, 27th July 1901 (Evans, "Annals," 1904, p. 129).
543. *METOPIA LEUCOCEPHALA*, *Rossi.*—♂, Humbie, 11th July 1904 (Evans).

Family MUSCIDÆ.

544. *HÆMATOBIA STIMULANS*, *Mg.*—Two ♂♂, Aberlady, 6th August 1904 (Waterston).
545. *POLLENIA VESPILLO*, *Fab.*—Bavelaw, 16th May 1904 (Evans).
546. *MORELLIA CURVIPES*, *Mcq.*—♂, Cowdenbeath, 11th June 1904 (Waterston).
547. *PYRELLIA CYANICOLOR*, *Ztt.*—♂, Loch Ard, 1st July 1903 (Carter).

Family ANTHOMYIIDÆ.

548. *POLIETES HIRTICRURA*, *Meade.*—♂, Balerno, 2nd June 1904 (Waterston, "Annals," 1904, p. 193).
549. *HYETODESIA UMBRATICA*, *Mg.*—♂, Cowdenbeath, 11th June 1904 (Waterston); ♂♂, Glencorse, 8th September 1898, Balerno, 24th May 1900, and Aberlady, 2nd June 1903 (P. H. G.).
550. *HYETODESIA PERDITA*, *Mg.*—♂, Aberlady, 4th June 1904 (Waterston).
551. *HYETODESIA VARIEGATA*, *Mg.*—♂, Musselburgh, 11th June 1904 (Carter).
552. *MYDÆA VESPERTINA*, *Fln.*—♂, Kinghorn, 29th May 1896 (P. H. G.); ♂, Aberfoyle, 1st July 1903 (Carter); ♂, Aberlady, 5th September 1903 (Waterston).
553. *MYDÆA PAGANA*, *F.*—♀, Aberdour, 6th July 1893 (P. H. G.); ♀, Kinghorn, 29th May 1896 (P. H. G.); ♀, Aberlady, 4th June 1896 (P. H. G.); ♀, Heriot, 28th June 1898 (Evans); ♀, Glencorse, 8th September 1898 (P. H. G.).
554. *MYDÆA SEPARATA*, *Mg.*—♂, Cowdenbeath, 11th June 1904 (Waterston). It appears to me that this may be only a variety of *M. impuncta*, *Fln.* [P. H. G.].
555. *SPILOGASTER NIGRINERVIS*, *Ztt.*—I find that the fly recorded in the first part of the List ("Annals," 1903, p. 222) under the name of *Mydæa nigritella*, *Ztt.*, really belongs to the present species. I have also seen specimens taken by Mr. Carter at Loch Ard (1st July 1903), and by Mr. Waterston at Cowdenbeath (11th June 1904).

M. nigritella, Ztt., may still hold its place in the "List," as I took it at Balerno, 1st July 1904, and have seen a ♂ from Cullalo, taken by Mr. Evans on the 9th of the same month.

556. LIMNOPHORA COMPUNCTA, *W.*—♂ ♂, Bavelaw, 11th July 1902, and Aberlady, 4th June 1904 (Waterston).
 557. HYDROTÆA CILIATA, *Fab.*—3 ♂ ♂, Craigentinny, 22nd August 1898 (Evans).
 558. HYDROTÆA OCCULTA, *Fab.*—♀, Glencorse, 8th September 1898 (P. H. G.); ♂, Inveresk, 28th May 1902 (Carter); ♀, Aberlady, 2nd June 1903 (P. H. G.).
 559. HYDROTÆA ARMIPES, *Fln.*—Musselburgh, 18th May 1901, and Inveresk, 5th June 1902 (Carter). The former specimen was recorded in the List ("Annals," 1903, p. 223) under the erroneous name of *albipuncta*, Ztt. This species may, however, remain, as it has been taken at Cowdenbeath by Mr. Waterston.

I may here also correct the record given as *H. rondanii* on the same page. This fly afterwards turned out to be the recently described *pilipes* (Stein), and has been fully recorded by me both in the "Annals" and the "Ent. Mo. Mag."

560. TRICHOPTICUS CUNCTANS, *Mg.*—I have seen ♀ ♀ from the following localities which I refer to this species: Balerno, 13th May 1893, and 19th June 1897 (P. H. G.); Hawthornden, 26th May 1893 (P. H. G.); Salton, 18th September 1903 (Evans).
 561. TRICHOPTICUS SEMIPELLUCIDUS, *Ztt.*—♂, Tynninghame, 4th September 1894 (Evans); ♂, Balerno, 24th May 1900 (P. H. G.); ♂, Balerno, 2nd June 1904 (Waterston).
 562. HYLEMYIA FLAVIPENNIS, *Fln.*—♂, Loch Ard, 6th July 1901 (Carter); ♂, Aberdour, 7th July 1904 (Waterston).
 563. HYLEMYIA PRÆPOTENS, *W.*—A ♂ of this very fine species was taken by Mr. Carter at Musselburgh, 26th June 1904.

564. PEGOMYIA BICOLOR, <i>W.</i> , and	{	Bred from larvæ found in dock leaves at Fairmilehead, near Edinburgh, in 1895, by Mr. W. Evans. Both flies have been determined by Herr P. Stein of Genthin, Prussia.
565. PEGOMYIA NIGRITARSIS, <i>Ztt.</i>		

566. HOMALOMYIA AEREA, *Ztt.*—♂, Aberfoyle, 30th June 1904 (Carter).
 567. HOMALOMYIA CORACINA, *Lw.*—♂, Balerno, 1st July 1904 (Waterston).

568. HOMALOMYIA SERENA, *Fln.*—♂ ♂, Bavelaw, 2nd June 1904, and Aberlady, 4th June 1904 (Waterston).
569. HOMALOMYIA INCISURATA, *Ztt.*—♂, Balerno, 2nd June 1904 (Waterston).
570. CÆLOMYIA MOLLISSIMA, *Hal.*—This peculiar fly appears to be not uncommon in the Forth district, as I have seen examples from Aberlady, Balerno, Cowdenbeath, Musselburgh, and Edinburgh.
571. CARICEA EXSUL, *Ztt.*—Both sexes at Aberlady, 7th June 1902, and 24th May 1904 (Waterston).
572. CARICEA MEANS, *Mg.*—♂ and ♀, Aberfoyle, 14th July 1903 (Carter).
573. HOPLOGASTER MOLLICULA, *Fln.*—Cramond, 25th June 1904 (Waterston).

Family CORDYLURIDÆ.

574. AMAUROSOMA FASCIATA, *Mg.*—3 ♂ ♂, Botanic Gardens, Edinburgh, 20th May 1904 (Waterston).
575. SPATHIOPHORA HYDROMYZINA, *Fln.*—♂, Cowdenbeath, 11th June 1904 (Waterston).
576. SCATOPHAGA SUILLA, *Fab.*—2 ♂ ♂, Aberfoyle, 3rd and 4th July 1903 (Carter).
577. SCATOPHAGA VILLIPES, *Ztt.*—I took both sexes of this quite distinct and interesting species at Aberdour, 7th July 1904.

Family SCIOMYZIDÆ.

578. DRYOMYZA DECREPITA, *Ztt.*—♀, Bavelaw, August 1898 (Evans, "Annals," 1904, p. 129).

Family PSILIDÆ.

579. LOXOCERA ARISTATA, *Pz.*—2 ♂ ♂, Luffness Links, July 1898 (Evans, "Annals," 1904, p. 129); 2 ♂ ♂, and also a ♂ of the var. *yerburyi*, Austen, at Aberlady, 7th August 1905 (Carter, "Annals," 1906, p. 25).

Family MICROPEZIDÆ.

580. MICROPEZA LATERALIS, *Mg.*—♀, Polton, August 1901 (Evans, "Annals," 1904, p. 129).
581. CALOBATA PETRONELLA, *L.*—Polton, June 1901 (Evans, *l.c.*).

Family ORTALIDÆ.

582. SEOPTERA VIBRANS, *L.*—♂, Salton, August 1902 (Evans, *l.c.*).

Family TRYPETIDÆ.

583. ACIDIA COGNATA, *W.*—Roslin, July 1896 (Evans, *l.c.*).
 584. SPILOGRAPHA ZOË, *Mg.*—Duddingston, 24th May 1895 (Evans, *l.c.*).
 585. SPHENELLA MARGINATA, *Fln.*—♀, near Balerno, August 1898 (Evans, *l.c.*).

Family LONCHÆIDÆ.

586. PALLOPTERA SALTUUM, *L.*—♂, Winchburgh, 30th June 1902 (Waterston); ♀, Musselburgh, 11th and 26th June 1904 (Carter).

Family SAPROMYZIDÆ.

587. SAPROMYZA LONGIPENNIS, *Fab.*—4 specimens, Aberdour, 7th July 1904 (P. H. G.).
 588. SAPROMYZA AFFINIS, *Ztt.*—♀, New Park, Midlothian, 11th July 1900 (Evans, "Annals," 1904, p. 129).

Family OPOMYZIDÆ.

589. BALIOPTERA TRIPUNCTATA, *Fln.*—Near Roslin, October 1900, and at Cramond, October 1903 (Evans, *l.c.*).
 590. PELETHOPHILA LUTEA, *Fln.*—♀, Linlithgow, August 1899 (Evans, *l.c.*).
 591. PELETHOPHILA FLAVA, *L.*—Coldingham, August 1905 (Waterston).

Family EPHYDRIDÆ.

592. NOTIPHILA ULIGINOSA, *Hal.*—2, Braid Hills, 12th June 1893 (P. H. G.).
 593. NOTIPHILA CINEREA, *Fln.*—2, Braid Hills, 12th June 1893 (P. H. G.); Cowdenbeath, 11th June 1904 (Waterston); Kilconquhar, 16th August 1904 (Evans).
 594. NOTIPHILA ANNULIPES, *Stnh.*—1, Braid Hills, 12th June 1893 (P. H. G.).
 595. HYDRELLIA RANUNCULI, *Hal.*—Blackford Hill, 27th June 1904 (P. H. G.).

Family CHLOROPIDÆ.

596. *MEROMYZA LÆTA*, *Mg.*—Gullane, July 1898 (Evans, "Annals," 1904, p. 129).
597. *CHLOROPS SPECIOSA*, *Mg.*—2 ♀ ♀, Dreghorn, July 1893 (Evans, *l.c.*).

Family AGROMYZIDÆ.

598. *CHROMATOMYIA OBSCURELLA*, *F/n.*—Glencorse, 8th September 1898 (P. H. G.).

Family NYCTERIBIIDÆ.

599. *NYCTERIBIA LATREILLEI*, *Leach.*—One off a Daubenton's Bat, Dunbar, June 1891 (Evans, "Annals," 1904, p. 129).

THE ROYAL SCOTTISH MUSEUM, EDINBURGH.

SOME FURTHER RECORDS OF SIPHONAPTERA (FLEAS) FROM THE FORTH AREA.

By WILLIAM EVANS, F.R.S.E.

IN the "Annals" for July 1904 (p. 193) I recorded eleven species of *Pulicidæ* which I had secured in the Edinburgh district (see footnote on next page). Since the publication of that note I have obtained nine other species, as given below, besides further examples of those previously recorded. My best thanks are again due to the Hon. N. C. Rothschild for his kindness in examining specimens sent to him for determination or verification.

Including *Ctenopsylla* (*Typhlopsylla*) *spectabilis*, Rothschild, five specimens of which were taken by Mr. Rothschild from a Bank Vole (*Hypudæus glareolus*) at North Berwick in Sept. 1898, as recorded by him in the "Entomologist's Record," vol. x., my list of Forth Siphonaptera comprises

twenty-one species, or fully one-half of the number that have been recorded as British. If one were to take many birds' nests, keeping them for a time in bags or glass-topped boxes, and to trap large numbers of mammals, the list could soon be considerably extended—say to thirty species or thereby; but for several reasons, apart from a touch of sentiment, I can only work at the group in a limited way. The assumption that the range of a parasite must be co-extensive with that of its "host" is so reasonable that local lists of them may seem to be unnecessary. It is a good rule, however, in this as in other matters, to apply the test of actual observation. Besides, we have still much to learn from local observations regarding the limitations to which each species is subject in the matter of hosts.

The species I have now to record are:—

Pulex felis, Bouché.—One (♀) off my cat, Edinburgh, Oct. 1905; identification confirmed by Hon. N. C. Rothschild. For characters separating this form from the next (both are comprised under the name "*serraticeps*"), see Mr. Rothschild's articles in "Ent. Record," 1901, p. 126, and "Novitates Zoologicæ," 1905, p. 192.

P. canis, Curt.—Prof. Bradley, of the Royal Veterinary College, Edinburgh, tells me that they occasionally get *Pulex serraticeps* on dogs brought there for treatment. With the exception of one example of *P. canis* (♂), all the fleas (some dozens) I have recently obtained from dogs have been *P. irritans*, and I am inclined to think this is the rule in the case of house dogs.

Ceratophyllus fringillæ, Wlk.—Common in nests of Sparrows and other passerine birds. My specimens are from nest of House Sparrow (*Passer domesticus*), Tantallon Castle, May 1905; and Starling's nest, Dalmeny, May 1906, swarming.

C. newsteadi, Rothschild.—A number from nest of Blackbird (*Turdus merula*), near Edinburgh, June.

Typhlopsylla agyrtes, Heller.—Two (♂ ♀) off Brown Rat (*Mus decumanus*), near Drem, Haddingtonshire, Dec. 1904; one (♀) from nest of Water Vole (*Arvicola amphibius*), Luffness Marsh, Feb. 1905. Mr. Rothschild has taken this species from the Bank Vole at North Berwick ("Novitates Zoologicæ," 1898, p. 539).

- T. bisectodentatus*, Kolen.—One (♀) from Weasel (*Mustela vulgaris*) killed near Dunfermline, Jan. 1905.
- T. pentacanthus*, Rothsch.—Two (♂ ♀) from same Weasel, Dunfermline, Jan. 1905.
- Ctenopsylla musculi*, Dugés.—A dozen examples from a House Mouse (*Mus musculus*) caught in Edinburgh, July 1905.
- Ceratopsylla jubata*, Wagner.—Several from Bat—Pipistrelle (*Vesperugo pipistrellus*), Dunbar, Sept. 1905.

As regards species recorded in my previous note,¹ there are only one or two additional facts that need be mentioned at present.

- Ceratophyllus garei*, Rothsch.—Several (both sexes) from nest of Water Vole, Luffness Marsh, Feb. 1905; also half a dozen from nest of Lapwing (*Vanellus vanellus*), Luffness Links, May 1906, and several from that of Ring Dove (*Columba palumbus*), Dirleton, June.
- C. styx*, Rothsch.—On 13th May this year I found both sexes of this flea plentifully in old nests of Sand Martins in sandbank, Dunbar Links, near Largo, before the birds had returned to their summer quarters. When the martins depart after the breeding season, most of the fleas are no doubt left behind in the nests, where, it would appear, they deposit their eggs, and thus give rise to a fresh brood in the spring ready to attack the birds when they come back. There is still much to learn about the life-histories of *Pulicidæ* and other parasites.
- Hystrichopsylla talpæ*, Curt.—Additional records for this "giant" species are, Moles' nests, south of Leadburn, Peeblesshire, March 1905, and Largo Links, Fife, May 1906.

¹ These were :—*Pulex irritans*, L. ; *P. erinacei*, Bouché (from Hedgehogs) ; *P. goniocephalus*, Taschb. (from rabbits) ; *Ceratophyllus sciurorum*, Bouché (from Squirrels) ; *C. fasciatus*, Bosc. (from ferret) ; *C. gallinæ*, Schrk. (from nests of domestic fowl) ; *C. garei*, Rothsch. (from nests of Song Thrush and Pintail Duck) ; *C. hirundinis*, Curt. (from nest of House Martin) ; *C. styx*, Rothsch. (from Sand Martins' nests) ; *Typhlopsylla gracilis*, Taschb. (common on moles and in their nests) ; *Hystrichopsylla talpæ*, Curt. (in Moles' nests, Pentland Hills). Have this year found *C. gallinæ* in Stock Dove's nest at Dirleton.

SOME INTERESTING NEMATODES IN THE
FORTH AREA.

By JAMES MURRAY.

Bunonema richtersi, Jägerskiöld. The genus, and this, the first known species, were described by Jägerskiöld exactly a year ago. It was known to its discoverer, Dr. Richters of Frankfort, who found it in material from Kerguelen, as long ago as 1901; in Lake Survey collections it was found in 1903 in ground moss at Fort Augustus. The distinctive feature of the genus is the warted back, the warts in two rows. There are a number of tactile processes round the mouth, and a pharynx of a familiar Nematode type. The warts are thimble-shaped, and vary greatly in number, sometimes extending the whole length of the body, sometimes only from the head to the middle. In Scotch examples there are always two single median warts at the posterior end of the rows, and usually, if not always, a single wart at the front edge. Known from several places in Scotland, but not yet placed on record, it was first unearthed in the Forth district by Mr. W. Evans, who sent me moss, in which it was present, from a bog at Thornton, Fife, 16th December 1905. This is, as yet, the only locality for it in the district. (See original description in "Zoologischen Anzeiger," xxviii. 557, February 1905).

Bunonema reticulatum, Richters. The second species, also discovered by Prof. Richters, and described very recently (in "Vorhandl. d. Deutsch. Zool. Gesellschaft," 1905, p. 46, Breslau), was discovered in Forth a fortnight earlier than the other, among moss collected by Mr. Evans in Hopetoun Woods, 2nd December 1905 near Bridge of Allan, 23rd December, and at Thornton. The species is distinguished by the great reduction of the warts, which are nearly hidden in the skin, and by a beautifully regular hexagonal pattern of pearly processes which connects the warts. In some Scotch specimens there are as many as five longitudinal rows of these hexagons, the largest median, the smallest on the sides, and the warts often indistinguishable. We have not yet any Scotch records for this species except Mr. Evans' Forth ones.

Desmoscolex minutus, Claparède. The third worm to be mentioned here we also owe to the industry of Mr. Evans, who got it on seaweed at Morrison's Haven, 17th November 1905. I do not know whether there are any previous local records of it. As the animal is marine it may well have occurred in the course of Dr. Scott's extensive work among the smaller marine forms.

It is an anomalous animal, which has puzzled systematists.

Claparède regarded it as an Annelid. Meczniow in 1865 discussed its affinities, and concluded that it is probably the larval condition of a known or unknown Arthropod, but gave no reason for his guess. Shipley ("Cambridge Nat. Hist." ii. 159) makes it a family Desmoscolecidae, at the end of the Nematodes.

The form we have may not be Claparède's species *minutus*, but if it is not, the differences are minute. It corresponds very closely with Meczniow's figure, only differing slightly in the arrangement of the hairs; at any rate, till the systematic position of the beast is assured, and we know whether it is larval or adult, it would serve no end to discriminate species by slight differences.

THE FLORA OF FAIR ISLE.

By JAMES W. H. TRAIL, A.M., M.D., F.R.S., F.L.S.

ON his return from Fair Isle in October 1905, Mr. Eagle Clarke left with me in Aberdeen examples of the plants observed during his stay in the island. They were preserved with formalin, and were mostly in good condition for determination; though a few had suffered owing to the late season of Mr. Clarke's visit.

I was unaware that any earlier collection of the plants of Fair Isle had been made or examined, except a few noticed by Mr. Beeby in his excellent papers on his botanical explorations in Shetland ("Scot. Nat.," 1887-1891, and "Ann. S. N. H.," 1892). Hence it appeared desirable to prepare a full statement of the species found on the island, in view of its isolation. The announcement in Mr. Clarke's account of his visit to the Fair Isle in the January issue of this Journal, that I was to report on his gatherings, brought me very welcome aid from Mr. Beeby and Mr. Bennett, both of whom sent lists of the species seen by them in collections made by the Rev. Ernest Straker of Croydon during visits made by him to the island about 1894. Mr. Straker's visits were devoted more, I understand, to photography than to botany. Mr. Bennett also favoured me with a perusal of a letter to himself from Mr. Straker, in which he says:—"The chief remarks that occur to me *re* the flora are as follows:—

"1. The scantiness as compared with that of Shetland.

"2. Distinct traces of an Atlantic and Germanic flora on W. and E. sides, although at widest 1 mile W. to E.—more shown, perhaps, in forms than in distinct species.

"3. Low altitude of *Salix herbacea*, say 700 feet on the Ward Hill, and alpine aspect of other species at this elevation, e.g. *Luzula sylvatica*."

Mr. Clarke's description of the island allows a clear idea to be formed of the various types of vegetation that may be expected to be found on it. The wind-swept surface is unfavourable to all woody plants except a few creeping shrubs of dwarf growth. The heathy moorland of the northern two-thirds can have only a few species on it. The rough pasture, the wet moor and pools, the banks of the small streams and the crevices of the rocky coasts should be richer in species, though limited to a considerable extent by neighbourhood to the sea, with liability to the drifting over them of salt spray. The small extent of cultivated ground, its peaty nature, and its exposure to storms and to spray, must limit the number of "colonists" or weeds introduced with cultivation, though several of these are found.

A list of all the species of vascular plants known to me to have been found on Fair Isle will be followed by some remarks on the list and on individual species recorded in it. I have no direct information as to the abundance or scarcity of each species, or as to its relation to cultivated ground, houses, or other indications of the likelihood of its introduction by man's aid; but probably one is not likely to go much astray in judging of the likelihood of alien origin by applying the information gained in other districts of northern Scotland. The lists kindly sent me by Mr. Beeby and Mr. Bennett, though both based on Mr. Straker's collections, differ in their records of species, indicating that they have been drawn up from different materials; and Mr. Clarke's collections include a good many not in either list. A number are in all three lists, and, in the absence of more direct information, the relative frequency of at least the less conspicuous species may be inferred from their occurrence in one, or in two, or in all three lists. This is indicated below by the letters following each species, A denoting its

inclusion by Mr. Arthur Bennett, B by Mr. Beeby, and C its occurrence in Mr. Clarke's collection.

The names and order of arrangement are in the main those of the 9th edition of the "London Catalogue."

- Ranunculus hederaceus*, L. A, B.
R. Flammula, L. A, B, C.
R. acris, L., approaching var. *pumilus*. B, ? C.
 sub. sp. *Steveni* (Andrz.). B.
Caltha palustris, L. A, B, C.
Cardamine pratensis, L. A, B, C.
Cochlearia officinalis, L. A, B.
C. grœnlandica, L. B.
C. danica, L. A, C.
Bursa Bursa-pastoris, Weber. A.
Viola palustris, L. C.
V. Riviniana, Reich. C.
V. ericetorum, Schrader. B.
Polygala serpyllacea, Weihe. A, B.
Silene maritima, With. A, B, C.
Lychnis dioica, L. A, B, C.
L. Flos-Cuculi, L. A, C.
Cerastium tetrandum, Curtis. A, B.
C. triviale, Link. A, B, C.
 var. *holosteoides*, Fr. B.
Stellaria media, L. A, B, C.
Sagina procumbens, L. A, B, C.
Spergula arvensis, L., var. *vulgaris* (Boenn.). A.
Montia fontana, L. A, C.
 var. *rivularis* (Gm.). B.
Hypericum pulchrum, L. A, B.
Trifolium repens, L. A, B, C.
Anthyllis Vulneraria, L. A.
Lotus corniculatus, L. A, B, C.
 also a red-flowered variety. B.
Vicia Cracca, L. A.
Spirœa Ulmaria, L. C.
Potentilla "Tormentilla," L. A, B.
P. Anserina, L. A, B, C.
Sedum roseum, Scop. B, C.
Myriophyllum ?alterhiflorum, DC. C.
- Callitriche hamulata*, Kuetz. A.
Epilobium obscurum, Schreb. C.
G. palustre, L. A, B, C.
Hydrocotyle vulgaris, L. A, C.
Ligusticum scoticum, L. A, B, C.
Angelica sylvestris, L. A, B, C.
Galium saxatile, L. A, B.
G. palustre, L. B, C.
 var. *Witheringii* (Sm.). A.
G. Aparine, L. A.
Scabiosa succisa, L. C.
Bellis perennis, L. A, C.
Antennaria dioica, R. Br. A, B, C.
Gnaphalium uliginosum, L. A, B.
Achillea Millefolium, L. A, B, C.
 var. *lanata*, Koch. B.
A. Ptarmica, L. A.
Matricaria inodora, L. A, B, C.
M. maritima, L. C.
Tanacetum vulgare, L. C.
Artemisia vulgaris, L. A, C.
Senecio vulgaris, L. A.
S. Jacobœa, L. A.
S. aquaticus, Huds. A, B, C.
Cnicus lanceolatus, Welld. A, B, C.
Leontodon autumnalis, L. A, B, C.
Sonchus oleraceus, L. A.
S. asper, Hoffm. A, C.
S. arvensis, L. A, B.
Jasione montana, L. A, B.
 var. *major*, Koch. B.
Calluna erica, DC. A, B.
Erica cinerea, L. C.
Armeria maritima, Willd. A, B, C.
Gentiana campestris, L. A, B.
Lycopsis arvensis, L. A, B, C.
Myosotis cœpitosa, F. Schultze. A, C.
M. arvensis, Lam. A.
Euphrasia officinalis, L. aggr. A, B, C.

- E. borealis*, Townsend. B.
E. foulaensis, Townsend. B.
E. scottica, Wettst. B.
Pedicularis sylvatica, L. A, B.
Rhinanthus Crista-galli, L. A.
Pinguicula vulgaris, L. A, B.
Mentha hirsuta, Huds. B, C.
(Puccinia Menthæ, Pers., occurred
in Mr. Clarke's collection
on this plant.)
Thymus Serpyllum, L. A, C.
Prunella vulgaris, L. C.
Galeopsis Tetrahit, L. C.
Lamium purpureum, L. A, C.
Plantago major, L. C.
P. lanceolata, L. A.
P. maritima, L. A, B, C.
var. *hirsuta*. B.
P. Coronopus, L. A, B, C.
Atriplex Babingtonii, Woods. A,
B, C.
Polygonum aviculare, L.
var. *agrestinum* (Jord.). B.
P. amphibium, L., f. *terrestre*.
A, C.
Rumex crispus, L. C.
R. domesticus, Hartm. B.
crispus × *domesticus* (= *propinquus*, Aresch.). B.
R. Acetosa, L. A, C.
R. Acetosella, L. B, C.
Euphorbia Helioscopia, L. A, C.
Urtica dioica, L. A.
Salix repens, L. A, B, C.
S. herbacea, L. A, B.
Empetrum nigrum, L. A, B.
Orchis latifolia, L. A, B.
Habenaria viridis, R. Br. C.
Scilla verna, Huds. A, B.
Narthecium Ossifragum, L. A.
Juncus bufonius, L. A, B, C.
J. lamprocarpus, Ehrh. A, B, C.
J. supinus, Moench. A, B, C.
- Luzula maxima*, DC. A, B, C.
L. campestris, DC. A, B.
L. erecta, Desv. A.
Sparganium ramosum, L. C.
Potamogeton polygonifolius, Pour.
A, B, C.
Eriophorum angustifolium, Roth.
A, B, C.
Carex echinata, Murr. A, B.
C. rigida, Good. A, B.
C. Goodenovii, J. Gay. B.
var. *juncella* (T. M. Fries).
A, B.
C. flacca, Schreb. A, B.
C. panicea, L. C.
C. binervis, Sm. A, B.
C. flava, L. B.
C. Ederi, Retz. A.
Phalaris arundinacea, L. A, B.
Aira præcox, L. A, B.
Deschampsia cæspitosa, Beauv.
A, B.
Holcus lanatus, L. C.
Molinia varia, Schrank. A.
f. *minima*. B.
Poa annua, L. A.
Glyceria fluitans, R. Br. A.
Festuca ovina, L. A, B.
f. *vivipara*, B.
F. rubra, L. A, B.
Lolium perenne, L. A.
Agropyron repens, Beauv. B.
var. *barbatum*, Duv.-Jouv. B.
Juniperus nana, Willd. A, B, C.
Pteris aquilina, L. A, B, C. '
Lomaria Spicant, Desv. A, B.
Asplenium marinum, L. A, B, C.
Athyrium Filix-fœmina, Roth.
A, B.
Lastræa dilatata, Presl. C.
Equisetum arvense, L. A.
E. palustre, L. A, B.
Lycopodium Selago, L. A, B.

An inspection of the above list confirms Mr. Straker's remarks upon the scantiness of the flora. While there must

be a considerable number of species on the island in addition to those enumerated above, it cannot be supposed that the total can approach near to the number for Shetland, which is not much below 500 species on trustworthy evidence, while for Orkney the number considerably exceeds 500, if we include "aliens" in an apparently wild state.

Of the species represented in the collections made on Fair Isle the following certainly owe their presence there to man's agency, if we may judge by their distribution in other parts of the North of Scotland:—*Bursa Bursa-pastoris*, Web., *Spergula arvensis*, L., *Tanacetum vulgare*, L., *Lycopsis arvensis*, L., *Galeopsis Tetralit*, L., *Lamium purpureum*, L., *Euphorbia Helioscopia*, L. I think that some others also most probably have been introduced by man, though not venturing, in absence of information as to their mode of occurrence, to definitely class them as "aliens." These are *Artemisia vulgaris*, L., *Senecio vulgaris*, L., *Sonchus oleraceus*, L., *S. asper*, Hoffm., and *Urtica dioica*, L. Possibly even a few others may be doubtful in this respect, such as *Galium Aparine*, L., *Senecio Jacobæa*, L., *Sonchus arvensis*, L., *Plantago major*, L., and *Polygonum aviculare*, L., var. *agrestinum*; but only a personal knowledge of their habitats on the island could warrant a definite conclusion on this point.

The remaining species do not reach the number of one hundred.

The following varieties in the Fair Isle lists have not, so far as I am aware, been put on record from either Orkney or Shetland, though probably they occur in them also:—*Cerastium triviale*, Link, var. *holostcoides*, Fr., *Galium palustre*, L., var. *Witheringii* (Sm.), and *Achillea Millefolium*, L., var. *lanata*, Koch.

Mr. Beeby writes of this last form, as brought by Mr. Straker from Fair Isle:—"The plant was very dwarf and very shaggy, and I think rightly referred. It is different from any other I have seen in Shetland, although localities similar to that in which it grows in Fair Isle are frequent elsewhere. It is the only form that I have met with that seems to be peculiar to Fair Isle in the Shetlands." This variety has been recorded from Caithness also.

Cochlearia grænlandica, L. The plant accepted under

this name in Britain occurs in Shetland and almost certainly in Orkney also, though recorded with a query for the latter flora. *Viola ericetorum*, Schrader, has not been distinguished in Orkney from the other "dog violets," while it has been so in Shetland. *Epilobium obscurum*, Schreb., is on record for Orkney, but not for Shetland.

Spergula arvensis, L., var. *sativa*, Boenn., is common in both vice-counties, while var. *vulgaris*, Boenn., is a scarce form in Scotland, and had not previously been noted from any county north of Aberdeenshire. It is, therefore, surprising to find it recorded from Fair Isle, where var. *sativa* does not appear to have been observed.

In conclusion, our present knowledge of the flora of the island is not sufficient to indicate an evidently closer affinity to one group of the neighbouring isles rather than to the other.

ADDITIONAL RECORDS TO "TOPOGRAPHICAL BOTANY," 2nd Ed., 1883.

By ARTHUR BENNETT, F.L.S.

THESE few records are those of 1905 so far as known to me.

The numbers and sequence of the counties are the same as in "Top. Botany."

84. LINLITHGOW.

† Malva moschata	} <i>Brock, sps.</i>
Hypericum quadratum	
Agrimonia Eupatoria	
Lactuca muralis	
Veronica Anagallis	

88. PERTH, MID.

Polystichum angulare, *Somerville, teste* "Druery."

90. FORFAR.

Cochlearia micacea, *Marshall, sp.*

91. KINCARDINE.

Carex teretiuscula, *A. Somerville.*

98. ARGYLE.

Polystichum angulare, *Moore's* "Brit. Ferns."

99. DUMBARTON.

Arabis hirsuta, *A. Somerville*, 1883.

100. CLYDE ISLES.

Aira alpina, *A. Somerville* ! 1895.

101. CANTIRE.

<i>Rumex pratensis</i>	} <i>Somerville, sps.</i>
<i>Orchis latifolia</i>	
<i>Juncus effusus</i> × <i>conglomeratus</i>	
<i>Carex rostrata</i> × <i>vesicaria</i>	
<i>Polystichum angulare</i> , <i>Somerville</i> , 1899.	

102. EBUDES, SOUTH.

Mostly collected by Dr. Gilmour, and specimens sent by Mr. A. Somerville.

<i>Ranunculus hirsutus</i> .	<i>Betula verrucosa</i> .
<i>Polygala oxyptera</i> .	<i>Quercus sessiliflora</i> .
<i>Rosa glauca</i> , <i>Vill. f.</i>	„ <i>pedunculata</i> .
<i>Senecio erucifolius</i> (<i>var. tenuifolia</i> , <i>Duby?</i>)	<i>Orchis ericetorum</i> , <i>Linton</i> .
<i>Taraxacum erythrospermum</i> .	<i>Sparganium ramosum</i> (<i>microcarpum</i>).
† <i>Vinca minor</i> .	<i>Carex flava</i> × <i>fulva</i> .
<i>Myosotis collina</i> .	„ <i>hirta</i> .
<i>Primula veris</i> .	<i>Triticum acutum</i> .
<i>Rumex domesticus</i> , <i>f.</i>	

103. EBUDES, MID.

<i>Ranunculus Drouetii</i>	} <i>Macvicar, sps.</i>
„ <i>trichophyllus</i>	
„ <i>bulbosus</i>	
<i>Sagina apetala</i>	
<i>Elatine hexandra</i> , <i>Miss Vachell</i> .	
<i>Plantago Coronopus</i> , <i>var. pygmæa</i> , <i>Lange</i>	} <i>Macvicar, sps.</i>
<i>Orchis ericetorum</i> , <i>Linton</i> .	

ADDITIONS AND CORRECTIONS TO THE TOPOGRAPHICAL BOTANY OF SCOTLAND.

By JAMES W. H. TRAIL, A.M., M.D., F.R.S., F.L.S.

(Continued from p. 100.)

CAMPANULACEÆ.

Lobelia Dortmanna, *L.* By the unfortunate omission of a hyphen between 94 and 106 in my former list the intermediate vice-counties seemed not to have had this species recorded from them. Its total records are 72-75, 77, 86-92, 94-112.

Jasione montana, *L.*, 85.

Campanula latifolia, *L.*, 84, 95, 98, 101 ("Gl. Cat.").

C. rapunculoides, *L.* In a number of counties, *e.g.* 75, 77, 91, 104, 105.

C. rotundifolia, *L.*, *var. lancifolia*, *Mert. and Koch.*, has been recorded from 94, 100, and 104 ("Gl. Cat."), 109, 110.

var. speciosa, *More*, 110.

C. persicifolia, *L.*, 94.

C. Rapunculus, *L.*, 83, 86 (Sonntag). *C. persicifolia*, *L.*, 83 and 84 (Sonntag), 94. *C. patula*, *L.*, 83 *cas.* (Sonntag).

Specularia pergonia, *A. DC.*, 83. *S. Speculum*, *A. DC.*, 83. *S. hybrida*, *DC.*, 86 *cas.* (Sonntag).

VACCINIACEÆ.

Vaccinium Vitis-idaea, *L.*, 91, 101, 112.

V. uliginosum, *L.*, 99, 101.

Schollera Occycoccus, *Roth.*, 100 and 101 ("Gl. Cat.").

ERICACEÆ.

Arctostaphylos alpina, *Spreng.*, 107.

Andromeda polifolia, *L.*, 80, 83, 102. The record for 75 is probably erroneous.

Erica Tetralix, *L.*, 78, *i.e.* from every vice-county.

Pyrola rotundifolia, *L.*, 93 ?, 108.

P. media, *Sw.*, 104. Sonntag gives this for 83.

P. minor, *L.*, 101.

P. secunda, *L.*, 87, 99. Sonntag gives it for 84 and 86.

Moneses grandiflora, *Gray*, 72 (extinct). Delete 88.

PLUMBAGINACEÆ.

Statice Limonium, *L.*, 72 (in "Top. Bot.").

S. rariflora, *Drej.*, 72 (in "Top. Bot.").

Armeria maritima, *Willd.* This should read:—*except* 77?, 78, 79, 80, 87.

var. planifolia, *Syme.*, has been recorded from 88, 92, 97, 105, 108.

PRIMULACEÆ.

Primula veris, *L.*, 102, 110.

Lysimachia vulgaris, *L.*, is given for 101 in "Gl. Cat."

L. punctata, *L.*, "South-west of Scotland," 90; *L. ciliata*, *L.*, 91.

L. Nummularia, *L.*, 84, 99, without statement as to claim to be native.

Trientalis europæa, *L.*, 105.

Glaux maritima, *L.*, 77 ("Gl. Cat."), 86.

Anagallis arvensis, *L.*, 92, 93 (weed), 104, 110. *Not* recorded from 108.

A. coerulea, *Schreb.*, 76 ("Gl. Cat."), 83, 91, 93, 94, 95, 99 ("Gl. Cat."), probably little established, or only a casual in most of these.

A. tenella, *L.*, 72.

Centunculus minimus, *L.*, 73 (*not* from 74).

Samolus Valerandi, *L.*, 86 ("Gl. Cat.").

OLEACEÆ.

Fraxinus excelsior, *L.* On record from all except 111 and 112.

APOCYNACEÆ.

Vinca major, *L.*, 75, 85, 98, 102, as an escape or perhaps planted.

V. minor, *L.*, 74, 86, 93, 98, 102.

GENTIANACEÆ.

(*Blackstonia perfoliata*, *Huds.*, has been recorded as found at Orchardton, in 73, on 4th June 1887, at an excursion of the Dumf. and Galloway Nat. Hist. Society.)

Erythraea Centaurium, *Pers.*, *var. capitata*, *Koch.*, 103, 110?

Gentiana Amarella, *L.*, 85 (*not* 88), 89?, 100.

(*G. uliginosa*, *Willd.*, is quoted by Nyman as Scottish, and has been doubtfully recorded from coast east of Nairn by Rev. E. S. Marshall in 1899.)

G. baltica, *Murbeck*, 74, 95, 100, 107, 110.

Limnanthemum peltatum, *Gmel.*, 86.

POLEMONIACEÆ.

Polemonium cæruleum, L., 76, 98, 105 ("Gl. Cat."), 93.

BORAGINACEÆ.

Asperugo procumbens, L., 83, 84, 94, little more than a casual.

Echinosperrum Lappula, L., 76, 83, 86.

Symphytum officinale, L., 96, 97 and 98 ("Gl. Cat."), 101, 103 ("Gl. Cat."), 105. Probably introduced in most of these vice-counties.

var. patens, *Sibth.*, 83.

S. tuberosum, L., 101 ("Gl. Cat."), 109.

S. asperrimum, Bab., 83, 93, 94, 105, 107, 109. Usually as relicts from cultivation.

S. tauricum, An outcast or escape here and there, *e.g.* in 91 and 92.

Borago officinalis, L., 75 cas.

Anchusa officinalis, L. Outcast or escape, 72, 77, 83, 86, 99 ("Gl. Cat.").

A. sempervirens, L., 75-77, 79, 81, 83, 84, 86, 90, 93-95, 101 ("Gl. Cat."), 108.

A. hybrida, Tenore, casual by River Spey, 94, 95. *A. stylosa*, Bieb., 83 cas.

Lycopsis arvensis, L., 78, 103; now recorded from every vice-county

Pulmonaria officinalis, L. Casual or escape, 75, 83, 84, Perthshire, 92.

Pneumaria maritima, *Hill*, 107.

Myosotis palustris, *With.*, 94 confirmed.

var. strigulosa, *Mert.* and *Koch.*, 75-77 and 89 ("Gl. Cat."), 91, 95-98, 102, 101 and 103 ("Gl. Cat."), 109.

var. nemorosa, *Besser*, 109.

M. sylvatica, *Hoffm.*, 76 ("Gl. Cat.," 94, 97 ("Gl. Cat."); probably an outcast, or escape, or planted in many places in Scotland.

M. arvensis, *Lam.*, *var. umbrosa*, *Bab.*, recorded in "Gl. Cat." for 75-77, 98, 99, 101.

M. collina, *Hoffm.*, 79. Not recorded for 96.

Omphalodes verna, Mönch, 83, 84, 92, 93; in woods, and by streams, probably planted originally. *O. linifolia*, Mönch, 83 cas.

Lithospermum purpureo-cæruleum, L., 84.

L. officinale, L., 94, 96 confirmed, 98.

L. arvense, L., 100, 101 ("Gl. Cat.").

Echium vulgare, L., 98 and 99 ("Gl. Cat.").

Amsinckia lycopsoidea, *Lehm.*, and *Cerinthe minor*, L., both 83 cas.

CONVOLVULACEÆ.

- Volulus sepium*, *Junger*, 80†, 84, 93†, 96† ?, 105†, 111†.
Convolvulus arvensis, *L.*, 93† ?, 94† ?, 97, 101 ("Gl. Cat.").
C. tricolor, *L.*, casual, *e.g.* in 83, 92.
Cuscuta Epilinum, *Weihe*, 75, 83, an alien, 100.
C. Epithymum, *Murr.*, 89, probably casual.
C. planiflora, *Ten.*, 83 cas.

SOLANACEÆ.

- Solanum Dulcamara*, *L.*, 97 ("Gl. Cat.").
Lycopersicum esculentum, *L.*, casual, *e.g.* in 83, 95.
Lycium chinense, *L.* (This is the plant commonly known as *L. barbarum*), 93†.
Atropa Belladonna, *L.*, 105†.
Datura Stramonium, *L.*, 83 cas.
Hyoscyamus niger, *L.*, 99.

SCROPHULARIACEÆ.

- Verbascum Thapsus*, *L.*, 98 ("Gl. Cat."), 102.
Linaria Cymbalaria, *Mill.*, 76 ("Gl. Cat."), 90, 92, 93, 98 and 100 ("Gl. Cat."), 105.
L. Elatina, *L.*, † or casual in 75, 94, 95. *L. purpurea*, *L.*, 83 casual.
L. repens, *L.*, 93.
L. vulgaris, *Mill.*, 112†.
L. viscida, *Manch.*, 83 cas., 84. *L. chalepensis*, *Mill.*, 83 cas.
Antirrhinum Orontium, *L.*, 83 cas.
Scrophularia nodosa, *L.*, 111.
S. vernalis, *L.*, 76 and 77 ("Gl. Cat.").
Mimulus Langsdorffii, *Donn.* This is the correct name of the plant commonly called *M. luteus* in British floras, 76 and 77 ("Gl. Cat."), 79, 81, 84, 95-99, 100 and 101 ("Gl. Cat."), 104, 105, 107-109, 112.
M. guttatus, *DC.*, 94, 95, 105, 109.
Veronica polita, *Fr.*, 93, 98 and 102 ("Gl. Cat."), 107. *Not* from 79.
V. Tournefortii, *C. Gmel.*, 76, 97, 99 and 104 (all "Gl. Cat."), 107, 110.
V. spicata, *L.*, 75 †.
V. Chamæpitys, *Griseb.*, 83 cas. *V. peregrina*, *L.*, 83 cas.
V. arvensis, *L.*, *var. eximia*, *Towns.*, 109.
V. montana, *L.*, 93.
V. scutellata, *L.*, *var. villosa*, *Schum.*, appears to be much less frequent than the glabrous variety; but is widespread.
V. Anagallis-aquatica, *L.*, 84.

- Euphrasia borealis*, *Wettst.*, 88, 93-95, 97, 100, 105, 110.
E. brevipila, *Burnat* and *Gremli*, 75, 76, 93, 94, 96, 97, 100, 107, 110, 111.
E. nemorosa, *Mart.*, 109, 110, 111.
E. curta, *Fr.*, 93, 94, 106, 107, 110?, 111.
 var. glabrescens, *Wettst.*, 93, 95, 96, 101, 109, 111.
 var. piccola, *Towns.*, 91, 112.
E. latifolia, *Pursh*, 90, 96, 109, 111.
E. foulaensis, *Towns.*, 94, 95, 96, 106, 110.
E. gracilis, *Fr.*, 72, 77, 86, 89, 93, 94, 95, 99, 102-104 ("Gl. Cat."), 110, 111.
E. scottica, *Wettst.*, 88, 93, 94, 100, 107, 110, 111.
E. Rostkoviana, *Hayne*, 88, 92, 93, 94, 97, 112.
E. stricta, *Host.*, 96, 97, 100.

Several intermediates (probably crosses) between these *Euphrasie* have been recorded from a few localities.

- Bartsia Odontites*, *Huds.*, *var. verna*, *Reichb.*, 105, 108, 111.
 var. serotina (*Reichb.*), 106.
 var. litoralis, *Reichb.*, 109.

B. Trixago, *L.*, 83 cas.

Rhinanthus.—In this genus several forms have been recorded as follows:—

- Drummond-Hayi, *F. B. White*, 90, 92, 97, 105.
 fallax, *Wimm.* and *Grab.*, 95, 96, 110.
 pubescens, *Wallr.*, 110.
 stenophyllus, *Schur.*, 88, 89, 97, 105, 109.
 angustifolius, *Koch.*, has been recorded from 105, 106, 108?
 monticola (*Sterneck*), *Druce*, 97.
 borealis, *Druce*, 94.
R. major, *Ehrh.*, 83 cas, 94, 102 ("Gl. Cat."), 108. *Var. aptera* appears to be the only form found in Scotland.
Melampyrum pratense, *L.*, *var. montanum*, *Johnst.*, 90, 94, 97, 98, 99 and 104 ("Gl. Cat."), 105, 107, 108, 110, 111.
 var. hians, *Druce*, 94, 96, 103.
M. sylvaticum, *L.*, 77 ("Gl. Cat."), 97, 110 ("Gl. Cat.).

LENTIBULARIACEÆ.

- Utricularia vulgaris*, *L.*, 76.
U. neglecta, *Lehm.*, 95, 100 confirmed, 104.
U. minor, *L.*, 93, 103.
U. intermedia, *Hayne*, 85, 93, 112.
Pinguicula vulgaris, *L.*, 78; *var. bicolor*, *Nordst.*, 87, 97, 98.
P. lusitanica, *L.*, 86 ("Gl. Cat.")

LABIATÆ.

- Mentha rotundifolia*, L., 92, 96, 99 ("Gl. Cat."). Outcast or escape.
M. alopecuroides, *Hull*, 94†, 95†, 99 ("Gl. Cat."), 101†.
M. (sylvestris), L.) longifolia, *Huds.*, 74, 76 ("Gl. Cat.").
M. viridis, L., 77, 90, 105; var. *crispa*, *Hook*, 83, 95.
M. piperita, L., 84, 93†, 94†, 97† ?
M. sativa, L., 93, 94, 98, 103 and 104 ("Gl. Cat."); var. *paludosa*,
Sole, 84 (*Sonntag*), 93, 100.
M. rubra, *Sm.* (?) 83, 93, 97, 98 ("Gl. Cat.").
M. gentilis, L. ? *Syme* states ("E. B.," vii. 20) that he had seen
 examples of this from 72 and 81.
M. arvensis, L., 104; (not from 108).
M. Pulegium, L., 95†.
Lycopus europæus, L., 110 ("Gl. Cat.").
Origanum vulgare, L., 93†.
Thymus serpyllum, L., var. *prostratum*, *Hornem.*, 94, 109, 110,
 111.
T. Chamædrys, *Fr.*, *Clydesdale*, 80, 81, 88, 89, 95, 97, 107, 111.
Calamintha Clinopodium, *Spenn.*, 72, 73, 75 confirmed, 98
 ("Gl. Cat.").
C. graveolens, *Benth.*, 83 cas.
Salvia Horminum, L., and *S. verticillata*, L., 83 casuals.
Nepeta Cataria, L., 72 ?, 83; *N. Nepetella*, L., 83 cas.
Scutellaria galericulata, L., 85.
S. minor, L., var. *glandulosa*, *Ar. Benn.*, 110.
Marrubium vulgare, L., 99.
Stachys palustris × *sylvatica* (*S. ambigua*, *Sm.*), 91, 92, 93, 99, 100.
S. arvensis, L. 109; *S. annua*, L., 83 cas.
Galeopsis angustifolia, *Ehrh.*, 82, 83; *G. versicolor*, *Curtis*, 84.
G. Tetrabit, L., var. *bifida* (*Boenn.*), 97, 98, 103, 104, 105, 107,
 109.
Leonurus cardiaca, L., casual, 77, 83, 85 and 86 (*Sonntag*).
Lamium amplexicaule, L., 97.
L. intermedium, *Fr.*, 84, 94, 97, 104 ("Gl. Cat.").
L. hybridum, *Vill.* 91, 93.
L. maculatum, L., 77, 83, 85, 90, 98, 100, 103 (last three "Gl.
 Cat.").
L. album, L., 93, 98 ("Gl. Cat.").
L. Galeobdolon, *Crantz*, 76, 85, 86, 99 ("Gl. Cat.").
Ballota nigra, L., 74, 82 confirmed, 85 confirmed.
Teucrium Chamædrys, L., 90.

The following Labiatæ have been found as casuals:—

- Dracocephalum moldavicum*, L., 83; *D. parviflorum*, *Benth.*, 83.
Lallemantia peltata, *Fisch. and Mey.*, 83.

Leonurus cardiaca, L., 83.

Molucella lævis, L., 83.

Prasium majus, L., 92.

Sideritis lanata, L., 83; *S. montana*, L., 83, 94, 95.

Wiedemannia orientalis, Fisch. and Mey., 83.

PLANTAGINACEÆ.

Plantago major, L.; *var. intermedia*, *Gilib.*, 92, 93, 105, 107, 112; also given in "Gl. Cat." from 97, 98, 99. Probably widespread and not uncommon.

P. media, L., 76 ("Gl. Cat."), 79.

P. lanceolata, L.; *var. capitata*, Presl., 96, 105.

P. maritima, L., 77, 84, 86; *var. minor*, *Hook and Arn.*, 111; *var. hirsuta*, *Syme*, 110, 112; *var. pygmæa*, *Lange*, 105, 108, 109, 110; *var. pumila*, *Kjellm.*, 108, 110; *var. latifolia*, *Syme*, 109; *var. dentata*, *Wirtg.*, recorded from 109, but also in other counties.

P. Coronopus, L., 77 ("Gl. Cat."); *var. pygmæa*, *Lange*, 103, 111; *var. maritima*, *Gren. and Godr.*, 103, 109.

P. arenaria, Waldst. and Kit., 83 cas.; *P. Lagopus*, L., 83 cas.

P. lusitanica, L., 83 cas.; *P. ovata*, Forsk., 83 cas.

P. patagonica, Jacq., 83 cas.; *P. Psyllium*, L., 83 cas.; *P. Rugellii*, DC., 83 cas.

ILLECEBRACEÆ.

Herniaria glabra, L., 83 cas.; *H. hirsuta*, L., 83 cas.

Scleranthus annuus, L., 98 ("Gl. Cat."). The biennial state is probably not uncommon, though not often specially recorded.

MONOCHLAMYDEÆ.

AMARANTHACEÆ.

Amaranthus retroflexus, L., 83 cas.

CHENOPODIACEÆ.

Chenopodium polyspermum, L., casual in 83, 92.

C. Vulvaria, L. Seems little more than a casual in most parts of Scotland; 82, 85, 92 cas.

C. album, L. In addition to the varieties *incanum*, *viride*, and *viridescens*, previously recorded, another has been found not uncommonly near Aberdeen on rubbish heaps, viz., *var. leptophyllum*, Moq., a native of western Canada and U.S.A., whence the seeds are probably imported in cereals.

C. ficifolium, Sm. Not uncommon on rubbish near Aberdeen (92).

C. murale, L., 83 cas. *C. urbicum*, L., 83 cas.

- C. rubrum*, *L.*, 86 ("Gl. Cat."); 92 frequent casual.
C. Botrys, *L.*, 92 cas.
Beta maritima, *L.*, 75, 86 (Sonntag), 99; *B. vulgaris*, *L.*, occasionally on rubbish about towns, *e.g.*, near Aberdeen.
Atriplex littoralis, *L.*, 96; *A. rosea*, *L.*, 83 cas.
A. patula, *L.*, 78, 97, 105, 107. I have *not* seen a record for 80.
var. erecta, *Huds.*, 98 ("Gl. Cat."); *var. angustifolia* (*Sm.*), 92, 105.
A. calotheca, *Fr.*, 100 ?
A. hastata, *L.*, 72-77, 80-83, 85-87, 90-100, 102, 104, 105, 108-112.
A. Babingtonii, *Woods*, *var. virescens*, *Lange*, 91-94, 96, 99, 100, and 102 ("Gl. Cat."), 105-109, 112.
A. laciniata, *L.*, 90 confirmed, 92 very rare, 93, 95 confirmed.
Salicornia herbacea, *L.* The substitution of a hyphen for a comma in my former list makes it appear as if this plant were not recorded for 94 to 109. It is on record from 95 to 108.
Suaeda maritima, *Dum.*, 72 confirmed.
var. procumbens, *Syme*, 95, 96, 105.
Salsola Kali, *L.*, 108.
Blitum virgatum, *L.*, casual in 83 and 85.
Spinacia oleracea, *L.*, casuals in 83 and 92.

POLYGONACEÆ.

- Polygonum aviculare*, *L.* The following varieties have been recorded from Scotland:—*agrestinum* (*Jord.*); *vulgatum*, *Syme*; *arenastrum* (*Bor.*); *microspermum* (*Jord.*); *ruvavagum* (*Jord.*); *littorale* (*Link.*).
P. Raii, *Bab.*, 97; *P. maritimum*, *L.*, 83 cas.
P. Hydropiper, *L.*, 93, 109 ?†; *P. mite*, *Schrk.*, 86 ("Gl. Cat.")?
P. lapathifolium, *L.*, 84, 93, 94; *var. incanum*, *L.*, is frequent in various localities.
P. maculatum, *Dyer* and *Trimen*, 83.
P. Bistorta, *L.*, 79, 83†, 96†; *not* recorded from 78, 81.
P. viviparum, *L.*, 77 ("Gl. Cat."), 105, 107.

The following have been found as casuals:—*P. alpestre*, *C. A. Meyer*, 83; *P. Bellardi*, *All.*, 83; *P. cuspidatum*, *S. and Z.*, 83, 92.

- Fagopyrum esculentum*, *L.*, 75, 77, 82, 83, 85, 90, 93. Little more than casual. *F. tataricum*, *L.*, 92 cas.
Rumex conglomeratus, *Murr.*, 95. *Not* recorded from 106, 107.
R. sanguineus, *L.*, 96, 98, 103 ("Gl. Cat."), 109; *var. viridis* (*Sibth.*), 76, 77, 84, 86, 91, 100, 99 and 101 ("Gl. Cat."), 102 ("Gl. Cat.").
R. maritimus, *L.*, 92 cas.; *R. limosus*, *Thuill.*, 92 cas.

- R. obtusifolius*, *L.*, 103, completing the tale for this.
R. domesticus, *Hartm.*, 102, 106.
R. crispus × *domesticus* (*propinquus*, *Aresch.*), 91, 92, 93, 96, 105 (?).
R. crispus × *obtusifolius* (*acutus*, *L.*), 91, 93, 96, 101, 107.
R. domesticus × *obtusifolius* (*conspersus*, *Hartm.*), 93, 94, 95.
R. Hydrolapathum, *L.*, 74, 86, 93 confirmed, 95.
R. alpinus, *L.*, 93, 94, 99.
R. Acetosella, *L.*, *var. multifidus*; 92 on rubbish.
R. bucephalophorus, *L.*, casual in 83, 92.
Emex spinosum, Campbell, 83 cas.

ARISTOLOCHIACEÆ.

- Asarum europæum*, *L.*, 93†.

THYMELEACEÆ.

- Daphne Laureola*, *L.*, 84.

EUPHORBIACEÆ.

- Euphorbia dulcis*, *L.* As an introduced plant or escape in 73, 87, 95, 106, 110.
E. Esula, *L.*, 75, 82, 83, 84, 85 (Sonntag), 90, 95.
E. Cyparissias, *L.*, 75, 83, 85, 97.
E. exigua, *L.*, 84.
E. Lathyris, *L.*, 75, 77, 85 (Sonntag); *E. salicifolia*, Host, 90.
Mercurialis annua, *L.*, 82.

URTICACEÆ.

- Ulmus montana*, *Stokes*, 93, 94.
Humulus Lupulus, *L.*, 93, 94, 98, 99, 102.
Urtica urens, *L.*, 98; *U. pilulifera*, *L.*, 83 cas.
Parietaria officinalis, *L.*, 99 ("Gl. Cat.").
Cannabis sativa, *L.*, a frequent casual, *e.g.* in 83, 91-95.

CUPULIFERÆ.

- Betula verrucosa*, *Ehrh.*, 75, 78, 84, 86, 90, 93, 94, 97, 98, 99, 102, 104, 107, 110, 111.
B. pubescens, *Ehrh.*, 78, 83, 86, 90, 93, 94, 95, 97-99, 101, 103, 106, 108.
var. denudata, *Gren. and Godr.*, 88; *var. parvifolia*, *Wimm.*, 87, 88, 90, 96-98, 105, 108, 109; *var. carpathica* (*Wald. and Kit.*) *Regel*, 87, 88, 90, 97, 98, 108.
B. nana × *pubescens* (*alpestris*, *Fr.*), 108; (*intermedia*, *Thomas*), 90, 97.
Carpinus Betulus, *L.*, 74, 93, 98.

- Quercus Robur*, *L.*, aggr. in all; pedunculata, *Ehrh.*, 90, 93, 94, 96-98, 100, 102, 106; sessiliflora (*Salisb.*), 80, 82, 83, 90, 102, 107, 109†.
Castanea sativa, *Mill.*, 75, 83, 85, 93, 99, 101.
Fagus sylvatica, *L.*, 99, 105†, 108†, 109†, 110†.

SALICACEÆ.

These were inadvertently omitted from my former list; hence the distribution of each is here given in full, as far as earlier records known to me appear to require to be noticed. The numerous records of varieties have been largely omitted, chiefly because the difficulty of determining such in a genus like *Salix* makes the value of these records very doubtful in many cases, and also because many of the supposed varieties are now regarded as hybrids. The sub-joined list of hybrids rests on the testimony of experts in the study of the genus.

- Salix triandra*, *L.*, 72, 80, 81, 83, 88, 89?†, 90, 91.
S. pentandra, *L.*, 72-77, 79-94, 95?†, 96?†, 98-102, 105?, 107, 108, 110?†.
S. fragilis, *L.*, 72, 73, 75-102, 105, 106†, 110†, 111†. In almost all localities in Scotland this occurs under the form *britannica*, *F. B. White*, though seldom recorded as such. It is certainly an introduced plant in many of the northern counties, and may be so in all parts of Scotland.
S. alba, *L.*, 72-81, 83-105, 107, 109-111. Probably introduced in all parts of Scotland, certainly so in the northern counties.
var. vitellina, *L.*, 72, 77, 80, 88, 90.
S. cinerea, *L.*, in all.
S. aurita, *L.*, in all.
S. Caprea, *L.*, 72-109, 111.
S. repens, *L.*, 72-77, 79-81, 83-98, 100-112.
S. phylicifolia, *L.*, 72, 75 ("Gl. Cat."), 77, 79-81, 83, 84, 86-92, 95-98, 99 ("Gl. Cat."), 104, 105?, 106, 109, 111.
S. nigricans, *Sm.*, 72, 74, 78, 80, 81, 83, 86-90, 92, 95, 98, 99 ("Gl. Cat."), 102, 104, 105?, 111?.
S. Arbuscula, *L.*, 88, 89, 90?, 92, 98.
S. viminalis, *L.*, 72-77, 79-81, 83-96, 98, 100-102, 104†, 105, 107†, 108, 110†. Very frequently planted for basket-making; certainly introduced in many counties in the north, but it is scarcely possible to determine its claim to be indigenous.
S. lanata, *L.*, 88, 90, 92.
S. Lapponum, *L.*, 83, 86-90, 92, 94, 96-98, 105, 106, 108, 111?.
S. Myrsinites, *L.*, 72, 88, 90, 92, 96-98, 106?, 107, 108, 111.
S. herbacea, *L.*, 72, 73, 75, 86-90, 92, 94, 96-100, 102-112.
S. reticulata, *L.*, 87, 88, 90, 92, 97, 105?, 108, 111.

- S. *purpurea*, *L.*, 72-81, 83, 84, 86-93, 95, 97-103, 108. Probably introduced in a number of counties.
- alba* × *fragilis* (*viridis*, *Fr.*), 72, 80, 83, 88, 97.
- alba* × *pentandra* (*hexandra*, *Ehrh.*), 75, 83?, 90?.
- ? *alba* × *triandra* (*subdola*, *F.B.W.*), 88.
- Arbuscula* × *herbacea* (*simulatrix*, *F.B.W.*), 88.
- Arbuscula* × *Lapponum* (*spuria*, *Willd.*), 88.
- Arbuscula* × *Myrsinites* (*serta*, *F.B.W.*), 88.
- Arbuscula* × *nigricans* (*Krættliana*, *Brügg.*), 88, 98.
- Arbuscula* × *phylicifolia* (*Dicksoniana*, *Sm.*), 88.
- aurita* × *Caprea* (*Capreola*, *J. Kerner*), 86, 88, 90?, 108?.
- aurita* × *Caprea* × *phylicifolia*, 72.
- aurita* × *cinerea* (*lutescens*, *A. Kerner*), 72, 80, 86, 88-91, 107-109.
- ? (*aurita* × *cinerea*) × *nigricans*, 72, 90.
- aurita* × *cinerea* × *phylicifolia*, 72.
- aurita* × *herbacea* (*Margarita*, *F.B.W.*), 88, 89.
- aurita* × *Lapponum*, 83, 88, 89.
- aurita* × *Myrsinites* (*saxetana*, *F.B.W.*), 88, 90.
- aurita* × *nigricans* (*coriacea*, *Forbes*), 75, 86, 88, 90.
- aurita* × *phylicifolia* (*ludificans*, *F.B.W.*), 72, 75, 88, 94, 109.
- aurita* × *phylicifolia* × *purpurea* (*sequitertia*, *F.B.W.*), 72.
- aurita* × *purpurea* (*dichroa*, *Döll.*), 97.
- aurita* × *repens* (*ambigua*, *Ehrh.*), 72, 80, 81, 87-92, 94, 96, 103-105, 107-109, 111, 112.
- Caprea* × *cinerea* (*Reicharti*, *A. Kerner*), 85, 88, 89.
- Caprea* × *cinerea* × *phylicifolia* (*tephrocarpa*, *Wimm.*), 88, 89?.
- Caprea* × *Lapponum*, 89.
- Caprea* × *Myrsinites*, 90.
- Caprea* × *nigricans* (*latifolia*, *Forbes*), 72, 83, 88, 90.
- Caprea* × *phylicifolia* (*laurina*, *Sm.*), 72, 97, 104, 109. It has been recorded in "Gl. Cat." from 77, 86, 98, and 105, and, as *laurina*, from 88 and 90.
- Caprea* × *repens*, 108.
- Capreæ* × *viminalis* :—
- (*acuminata*, *Sm.*), 96; and in "Top. Bot." for 76, 77, 81, 83, 99, 102, 111.
- (*ferruginea*, *G. And.*), 74, 78, 88, 98; and in "Top. Bot." for 80, 81, 83-86, 90, 101, 102.
- (*sericans*, *Tausch*), 86, 88, 99, 105.
- (*Smithiana*, *Willd.*), 72-74, 86, 88, 89, 92†, 105, 106.
- (*stipularis*, *Sm.*), 72, 80, 88, 89, 106†?.
- (*velutina*, *Schrad.*), 98?.
- cinerea* × *Lapponum* (*cinerea-limosa*, *Laest.*), 83.
- cinerea* × *nigricans* (*strepida*, *Forbes*), 72, 88, 89.
- cinerea* × *phylicifolia* (*Wardiana*, *F.B.W.*), 88, 90.
- cinerea* × *purpurea* (*sordida*, *A. Kerner*), 88, 89.

cinerea × repens, 90, 108.

fragilis × pentandra (cuspidata, *Schultz*). Locality uncertain.

fragilis × triandra (decipiens, *Hoffm.*), 72, 79, 80, 85, 86, 88, 89.

herbacea × lanata (*Stephania*, *F.B.W.*), 88, 90. Rev. E. F. Linton

refers to this the willow known as Sadleri, *B. Syme*, from Glen

Callater in 92.

herbacea × Laponum (sobrina, *F.B.W.*), 89, 90.

herbacea × Laponum × ? Myrsinites (eugenes, *Linton*), 90.

herbacea × Myrsinites (*Sommerfeltii*, *Ands.*), 92.

herbacea × ? nigricans (*Moorei*, *Wats.*), 88, 90.

herbacea × phyllicifolia (*Grahami*, *Baker*), 89?, 108.

herbacea × ? repens (*cernua*, *Linton*), 92.

herbacea × reticulata (*onychophylla*, *And.*), 88, 90.

lanata × Laponum, 92.

lanata × reticulata (superstes, *F.B.W.*), 88.

Laponum × Myrsinites (*phæophylla*, *And.*), 90.

Laponum × nigricans, 90.

Laponum × phyllicifolia, 90.

Laponum × reticulata (*sibyllina*, *F.B.W.*), 90.

Myrsinites × nigricans (*Wahlenbergii*, *And.*), 88, 90, 92.

Myrsinites × phyllicifolia (*Norman*, *And.*), 88.

? Myrsinites × reticulata (eugenes, *Linton*), 90.

nigricans × purpurea, 72.

nigricans × repens, 88, 89.

nigricans × reticulata (semi-reticulata, *F.B.W.*), 88.

phyllicifolia × purpurea (*secerneta*, *F.B.W.*), 72.

phyllicifolia × repens (*Schraderiana*, *Willd.*), 89, 92.

purpurea × repens (*Doniana*, *Sm.*), 88, 90.

purpurea × viminalis (*rubra*, *Huds.*), 72, 75?, 77?, 78†?, 79, 88,

89, 95†?, 98?, 99?; also in "Top. Bot." from 80, 83, 86, 90.

var. *Forbyana*, *Sm.*, 77, 78, 80, 81, 98, 105; 90? in "Top. Bot."

repens × viminalis, 107.

? × reticulata (*sejuncta*, *F.B.W.*), 88.

triandra × viminalis (*undulata*, *Ehrh.*), 72, 77, 80, 81, 88, 89,

90, 92.

Populus alba, *L.*, 72-75, 77, 83-89, 91-95, 97, 100-102, 107.

Marked in the county records north of Forth and Clyde as planted or introduced, and probably it should be so marked in at least some others.

P. canescens, *Sm.* Not infrequent in plantations and elsewhere, though seldom distinguished in county lists. Probably planted in almost all cases.

P. tremula, *L.*, 72-81, 83, 85-112. The varieties *villosa*, *Lange*, and *glabra*, *Syme*, both appear to be not uncommon, though not often distinguished in the records.

P. nigra, L., is mentioned in several lists from 72 to 105, but there is no ground to regard this poplar as indigenous; and apparently different species are included under the name. Several are frequently planted, and may be met with by streams and elsewhere apparently wild.

EMPETRACEÆ.

Empetrum nigrum, L., 72-83, 85-112.

CERATOPHYLLACEÆ.

Ceratophyllum aquaticum, L. The aggregate is recorded from 81, 83-86, 88. The segregates are noted as follows:—

C. demersum, L., 83, 84 (Sonntag), 85, 88.

C. submersum, L., 84 and 85 (Sonntag).

(*To be continued.*)

ZOOLOGICAL NOTES.

Prosecution under the Wild Birds' Protection Act.—In Dornoch Sheriff Court on 13th June, Alexander M. Chance, Edgbaston, Birmingham, was prosecuted under the Wild Birds' Protection Act for robbing two nests of the Grey Lag Goose on Eilan Mor, Loch Loyal, Tongue, Sutherlandshire, on the 9th May. The defender did not put in an appearance, but was represented by an agent. Sheriff Mackenzie found the case proven, and imposed a fine of £9, being £1 for each egg taken.

Common Rorqual on the Kincardineshire Coast.—A large whale was found dead, floating in the sea near Stonehaven on the 26th of April last. It was towed into Crawton, where I examined it on the 28th when it was exposed for sale. It proved to be a young male *Balenoptera musculus*, the Common Rorqual of our coasts. Its total length was 44 feet; the pectoral fin was 5 feet long and 1 foot broad, the dorsal fin was only 12 inches high, and the tail was 8 feet 9 inches across the flukes. There were 48 longitudinal raised bands on the ventral surface. The baleen was dark slate colour edged and mottled with white, the usual colour for this species. The general colour was dark grey above and white below, and of course the animal was only a half-grown specimen, as the adult of this species reaches a length of 70 feet. Though called the Common Rorqual, it is not nearly so frequent on our coasts as the Lesser Rorqual (*Balenoptera rostrata*). —WILLIAM TAYLOR, Elgin.

Tree Sparrows in West Lothian.—A small party of Tree Sparrows (*Passer montanus*), which were first seen by me last winter, have remained in the district to breed. I have found the nesting quarters of three pairs and have no doubt there are more. I examined a clutch of five eggs, which were partly incubated eggs, on 18th May last. Perhaps you might like to note this in the "Annals," as the bird has apparently not been known to nest in West Lothian before.—SYDNEY E. BROCK, Kirkliston.

Wryneck in the Island of Lewis.—A Wryneck (*Lynx torquilla*) was obtained near Aignish, a crofting township between four and five miles south of Tiumpán Head Lighthouse. It was sent to Mr. M'Leay, Inverness, for preservation, and received by him 28th August 1905, and was seen there by Mr. Duncan Mackenzie of the Royal Hotel, Stornoway. Mr. Mackenzie suggests that the new Lighthouse may serve as a special attraction to migrants, and guide them into Broad Bay, and to the Eye Peninsula.—J. A. HARVIE-BROWN.

On the Occurrence of the Roller, and other Notes from Brora, Sutherland.—It will interest your readers to hear that on 28th May I saw a Roller (*Coracias garrula*) at Balnacail on the Brora. I think it was a male bird, as its plumage was very bright. I saw it again the next day, and believe it remained about for several days. It seemed to be getting a good supply of food on the ground. Its favourite perch was far out on a bare branch, and it never remained long on the ground. Its flight at times was rather like a woodcock, at others like a pigeon. It is the first I have ever seen up here, but I believe there is a specimen in the Museum at Dunrobin. I have seen them in Somaliland. This bird did not emit any sound, but in Africa I sometimes found them very noisy. It may interest you, too, to hear that Hedgehogs (*Erinaceus europæus*) seem to be on the increase in this part of Sutherland. I found three dead within the last two months on the bank of the river, and we have got two others in vermin traps. Some years ago they were very scarce. We had 5 Whooper Swans on the loch here for about ten days, and our old tame Swan was very much annoyed with them. Whoopers do not often come here.—FRANCIS G. GUNNIS, Brora.

Iceland Falcon in Lewis.—An Iceland Falcon (*Falco islandus*) was obtained on Eye Peninsula, Lewis, a mile south of Tiumpán Head, on 28th February. It had been seen for some days prior to that date. It had been sent to Mr. M'Leay for preservation, and was seen there by Mr. Duncan Mackenzie.

Mr. Mackenzie adds—"There were a few Iceland Gulls about as usual during the winter of 1905-6, and I observed what I considered unusual numbers of Purple Sandpipers."—J. A. HARVIE-BROWN.

Honey Buzzard in Fife.—We have to report that a Honey Buzzard (*Pernis apivorus*) was got on the Largo estate on 21st May. It was seen hovering over the field in which young pheasants are kept, and was most unfortunately shot. There is a bird of this same species in the Largo Museum, which was got some years ago at Balbirnie.—EVELYN V. BAXTER and LEONORA JEFFREY RINTOUL, Largo.

Bewick's Swan in N.-W. Mull.—On 21st October 1905, I had a note from Mr. Bryce Allan, younger of Aros, stating that a Bewick's Swan (*Cygnus bewicki*) had appeared in a loch near his house on 19th October. I confess that I at once thought there must be some confusion regarding the species, as *C. musicus* was the only kind hitherto seen by me here. On proceeding to the loch in question I was agreeably pleased to corroborate Mr. Allan's identification of the bird as *C. bewicki*. I managed to stalk to within 40 yards or so of the bird, and upon showing myself it rose from the loch, and flew round it twice, giving utterance to no sound that I could discern. The occurrence of this species is unusual here, and is worthy of record.—D. MACDONALD, Tobermory, Mull.

Capercaillies in Ayrshire.—Apropos of the record of this species in the "Annals of Scottish Natural History" for April, it may be of interest to place on record the following occurrence in the neighbouring county of Renfrewshire, for which I am indebted to Mr. A. A. Speirs of Elderslie. On the 6th November a girl who was taking a child for an airing, came to the keeper's house at Linwood and told him that "as she was walking along by the side of the East Wood a 'Cock Pheasant' had got up close to her and had felled itself against the wire fence." The keeper went to look for the bird, but failed to find it, but on the 10th November when taking his dog along that way the dog recovered a hen Capercaillie (*Tetrao urogallus*) out of the watering-place on the other side of the hedge. The bird, which was no doubt the same seen by the girl, was too much damaged to preserve.—J. MACNAUGHT CAMPBELL, Kelvin-grove Museum, Glasgow.

Buffon's Skua in Argyll.—On 6th June I received, shot on the hills at Morvern, a very fine male specimen of Buffon's Skua (*Stercorarius parasiticus*), the first example that has passed through my hands during the twenty years I have been here. I got a Stormy Petrel (*Procellaria pelagica*) from Lunga Treshnish about the same time with a white throat, which I believe is very unusual.—CECIL H. BISSHOPP, Oban.

Richardson's Skua in East Lothian.—I have lately seen two immature specimens of Richardson's Skua (*Stercorarius crepidatus*) in the possession of Mr. Hamilton Ogilvy at Biel House. He tells me that they were shot during a grouse drive in the Lammermoors on Halls Moor (parish of Shott), by Mr. C. Tunnard, on 16th

September 1905. It is worth remarking that two days later seven of this species were seen at Kincardine-on-Forth, as recorded by Mr. Harvie-Brown in the April "Annals."—H. N. BONAR, Saltoun, East Lothian.

Metoponorthus pruinus (Brandt) in the Forth District.—On turning over a board lying on a piece of waste ground at Slateford, near Edinburgh, on 26th April (1906), I noticed a number of Woodlice which seemed different from any I had previously met with in this district. Securing four—they were remarkably active—I found on examining them at home that they were undoubtedly referable to *Metoponorthus pruinus* (Brandt). The species is an addition to the list of "Forth" Land Isopods as given in Part I. of Dr. T. Scott's "Catalogue of Forth Crustacea," issued a few months ago. I have shown the specimens to Dr. Scott. The only previous record of this species for Scotland appears to be that of T. Edwards from Banff ("Life of a Scotch Naturalist," p. 436). It is stated to be common in the south-east of England, and occurs in the neighbourhood of Dublin (Dr. Scharff). Abroad it occurs in West, South, and East Europe, in North Africa, etc.—WILLIAM EVANS, Edinburgh.

Trematode (*Onchocotyle appendiculata*) on a Greenland Shark stranded in the Firth of Forth.—On the morning of 10th April 1906, a Greenland Shark (*Somniosus microcephalus* (Bloch)) was found stranded at North Queensferry. It was alive when first observed, but soon died. I examined it the following day. Length almost 11 ft., and greatest depth fully $2\frac{1}{2}$ ft.; colour dirty grey, darkest on the back, with whitish spots about $\frac{1}{4}$ in. in diameter scattered over the sides and under parts. In the gills I found several specimens of the Trematode, *Onchocotyle appendiculata* (Kuhn). I am indebted to Dr. T. Scott for the name of this curious parasite.—WILLIAM EVANS, Edinburgh.

BOTANICAL NOTES AND NEWS.

OBITUARY.

During the months of April and May died three men who did good work in the investigation of Natural History of Scotland, and of whom we hope to give a less brief notice in a future issue. They were :—

JOHN P. BISSETT, REV. JAMES FARQUHARSON, LL.D., AND
REV. JAMES M. CROMBIE.

MR. BISSETT was skilled in the examination of the Desmidiæ; and the valuable account of the Desmidiæ of Scotland by Dr. John Roy, which appeared in this Journal in 1893 and 1894, was

illustrated by plates of figures from Mr. Bissett's pencil. Dr. Roy died while the list was in course of publication; and the greater part of it was most carefully edited by Mr. Bissett. He also wrote on the Desmids of Japan, where he spent a good many years; and he was well acquainted with the flowering plants of Scotland.

DR. FARQUHARSON was the son of a former minister of the parish of Alford in Aberdeenshire, who was distinguished for his scientific researches in the early part of last century. The son inherited much of his ability. While a very young man he taught the class of Natural History in Marischal College, Aberdeen, during the session 1851-52, during the fatal illness of Professor MacGillivray, and again in 1852-53. Entering the Established Church of Scotland, he became minister of Selkirk, where he remained for over forty years, until his retirement from active life a few years ago. He was an active student of Natural Science, and promoted the work of the Berwickshire Club, contributing to its publications.

THE REV. JAMES M. CROMBIE was for some time a clergyman in Braemar, and he published a short account of the Natural History of that very interesting region. He afterwards settled in London and occupied his leisure with the study of Lichens. A volume by him on British Lichens was published a few years ago.

Plant Distribution in Scotland.—Important papers dealing with plant associations in Scotland, and with the methods of representing these associations in descriptions and maps, have recently appeared. Mr. Lewis, in his work on the peatmosses in the South of Scotland, and in his most recent paper in the *Scottish Geographical Magazine* for May 1906, is throwing much light on the climates and floras that prevailed in geologically recent times, and on the prevalence of Arctic types of vegetation during the formation of part of the peat.

Dr. M. Hardy in the same issue has an interesting paper on the "Botanical Survey of Scotland," and he has also published, in Paris, an "Esquisse de la Géographie et de la Végétation des Highlands d'Écosse," extending to 189 pages. Dr. Hardy has applied the methods so excellently taught at Montpellier by Professor Flahault to extending the survey begun by Dr. Robert Smith, and continued after his death by his brother. All interested in the flora of Scotland must welcome these investigations as supplementing, but in no way superseding, the methods of research and record with which the name of Mr. Hewett Cottrell Watson is so intimately associated. There is room for these lines of inquiry, and for others still, before the origin and distribution of the plants of Scotland can be fully understood and worthily recorded.

Saxifraga oppositifolia, L., at Sea-level in Islay.—In the "Annals" for 1904, at page 197, reference is made to the

discovery of *Saxifraga tridactylites*, L., by Dr. T. F. Gilmour, on the Machrie Links, Islay. On 9th April of the present year Dr. Gilmour was fortunate in adding another Saxifrage to the known flora of his island and of the South Inner Hebrides, v.-c. 102, viz., *S. oppositifolia*, L., a plant very different from the other, and from all the other seventeen British species of the genus—prostrate and creeping, and possessing a relatively large flower of rich purple. What renders Dr. Gilmour's discovery the more interesting is that he found the plant growing luxuriantly at what we may call the zero of altitude, viz., on exposed sea-coast rocks of the Mull of Oa, Islay, almost within reach of the waves, a habitat greatly differing from the shifting soil of the Machrie sand-dunes, six miles distant. We are accustomed to look on *S. oppositifolia* as a true "alpine," inhabiting the higher levels, the "Student's Flora" giving its altitudinal range as extending to 4000 feet. Yet we find this plant is in the short list of those which are happy either at high altitude or at the lowest levels, along with the Sea-pink, the Sea-campion, or the Sea-plantain. It should not be omitted that the late Professor J. H. Balfour met with *S. oppositifolia* near the Lighthouse at the Mull of Kintyre in 1844, that Mr. H. C. Hart records it as occurring in County Donegal, from sea-level upwards, and that Professor Trail informs me of its occurrence on the sea-coast in Aberdour and eastern Gamrie, in northern Aberdeenshire and Banffshire.—ALEX. SOMERVILLE.

CURRENT LITERATURE.

The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—April-June 1906.

[The Editors desire assistance to enable them to make this Section as complete as possible. Contributions on the lines indicated will be most acceptable, and will bear the initials of the Contributor. The Editors will have access to the sources of information undermentioned.]

ZOOLOGY.

MIGRATORY NOTES FROM ABERDEEN. W. Wilson. *Zoologist*, May 1906, p. 196.—Reference made to Ring-Ousel, Wheatear, and Cuckoo.

SCOTTISH PTARMIGAN. Seton P. Gordon. *The Field*, 7th April 1906, p. 560.—Deals with nesting habits, period of incubation, and other matters of general interest.

ENTOMOLOGICAL SCRAPS FROM A LEPIDOPTERIST'S NOTE-BOOK DURING A MONTH'S SOJOURN IN THE NORTH OF SCOTLAND IN THE SUMMER OF 1905. John G. Gardner. *Ent. Record*, April 1906, pp. 92-95.—A racy article, describing the results of collecting in the neighbourhood of Forres.

OPORABIA CHRISTYI, PROUT: A DISTINCT SPECIES. J. E. R. Allen, M.A. *Ent. Record*, April 1906, pp. 85-89.—A full description given, with localities, which include Rannoch and Oban.

NOTES ON SCOTTISH COLEOPTERA. Prof. T. Hudson Beare, B.Sc., F.E.S. *Ent. Record*, April 1906, p. 107.—Eight species mentioned, taken in the Forth district.

COLEOPTERA FROM FAIR ISLE, NORTH BRITAIN. Prof. T. Hudson Beare, B.Sc., F.E.S. *Ent. Mo. Mag.*, April 1906, pp. 77-78.—Substantially the same account as that which appeared in the "Annals," 1906, pp. 81-83.

CARIDA AFFINIS, PK., AN ADDITION TO THE BRITISH LIST. T. Hudson Beare, F.E.S. *Ent. Record*, April 1906, p. 107.—Draws attention to the capture of this Beetle by Colonel Yerbury at Aviemore.

HELP - NOTES TOWARDS THE DETERMINATION OF BRITISH TENTHREDINIDÆ. Rev. T. D. Morice, M.A., F.E.S. *Ent. Mo. Mag.*, April 1906, pp. 79-84.—*Nematus acuminatus*, Thoms., recorded from Ben Nevis.

NOTES ON THE HYMENOPTEROUS GENUS BRACON, FAB. Claude Morley, F.E.S. *Ent. Mo. Mag.*, May 1906, pp. 106-110.—Scottish localities given for *B. erraticus* and *B. guttiger*.

NOTES ON THE HYMENOPTEROUS FAMILY MICROGASTERIDÆ. Claude Morley, F.E.S. *Entomologist*, May 1906, p. 105.—Scottish localities given for *Apanteles salebrosus* and *Microgaster tibialis*.

THE HOST OF NOMADA SOLIDAGINIS. William Evans. *Ent. Mo. Mag.*, June 1906, p. 140.—Refers to the association of this species with *Andrena fuscipes*, as observed in West Perthshire.

ON THE BRITISH SPECIES OF HYDROTÆA, DSV. (Concluded.) Percy H. Grimshaw, F.E.S. *Ent. Mo. Mag.*, April 1906, pp. 73-77.—Scottish localities given.

NOTES ON BRITISH COPEPODA: CHANGE OF NAMES. Thomas Scott, LL.D., F.L.S. *Ann. and Mag. Nat. Hist.*, May 1906, pp. 458-466, pl. xi.—Scottish localities mentioned for the various species dealt with, and seven new genera proposed.

BOTANY.

BOTANICAL SURVEY OF SCOTLAND. By M. Hardy, D.Sc. (*Scot. Geogr. Mag.*, 1906, pp. 229-241, with map and illustrations).

ESQUISSE DE LA GÉOGRAPHIE ET DE LA VÉGÉTATION DES HIGHLANDS D'ÉCOSSE. By Marcel Hardy, D.Sc., Paris, 1905, gr. 8vo, 189 pages.

THE STATUS OF SOME BRITANNIC PLANTS. By Rev. E. S. Marshall, F.L.S. (*Journ. Bot.*, 1906, pp. 207-213).

PLANTS OBSERVED NEAR TOMINTOUL, N.B., JULY 1905. By Rev. E. S. Marshall, F.L.S., and W. A. Shoolbred, F.L.S. (*Journ. Bot.*, 1906, pp. 154-161).—An important contribution to the local botany of Scotland.

THE KINGUSSIE DISTRICT: A GEOGRAPHICAL STUDY. By Marion J. Newbigin, D.Sc. (*Scot. Geogr. Mag.*, 1906, pp. 285-315, with map and illustrations; botanical on pp. 299-309).

BOTANICAL EXCHANGE CLUB, REPORT FOR 1905. By the Editor and Distributor, J. Walter White, F.L.S., April 1906, 52 pages. Interesting notes on British plants, several relating to examples from Scotland.

BOOK NOTICES.

THE EGGS OF EUROPEAN BIRDS. By the Rev. Francis C. R. Jourdain, M.A., etc. Part I. (London: R. H. Porter.) Price 1os. 6d.

So far as we are able to judge from the first part, this work has much to recommend it. The plates are decidedly good, and the letterpress dealing with each species is adequate and affords much reliable information on a wide range of subjects—references to literature, local and foreign names, breeding range at home and abroad, description of eggs, breeding season, etc.—and bears evidence of considerable research as well as of first-hand knowledge on the part of the author. The author is a thorough believer in racial forms, and accepts the sub-species described in Dr. Hartert's "Die Vögel"; indeed, the form of treatment and get-up are identical, and the two may fairly be described as companion volumes. The work is to be completed in about ten parts, containing some 140 coloured plates, and promises to be an excellent one in all respects. Part I. contains 14 plates, with numerous figures showing the range of variation to be found in each species dealt with, while the letterpress runs to 80 pages.

A TREATISE ON ZOOLOGY. Edited by E. Ray Lankester, F.R.S., etc. Part V., Mollusca. By Paul Pelseneer, D.Sc. (London: A. and C. Black, 1906.) 15s.

The fifth volume of this great work is devoted to the Mollusca, and the fact that it has such a well-known specialist as Dr. Pelseneer as its author is a guarantee that the high standard of excellence, which has characterised the preceding parts, has been fully maintained. After dealing with this important phylum in its general aspects, the main portion of the volume is devoted to the systematic consideration of the subject, wherein are treated the various classes into which the Mollusca are subdivided. Under each of these classes and the families comprising them, a vast

amount of information is afforded concerning their anatomical and morphological characters, distribution, etc., and the genera included in each family are enumerated. As a scientific and masterly exposition of the subject with which it deals, Dr. Pelseneer's volume undoubtedly stands unrivalled.

THE NATURAL HISTORY OF SELBORNE. By the Rev. Gilbert White. Rearranged and classified by Charles Mosley. (London: Elliot Stock, 1905.) Price 6s.

There have been many editions of this well-known classic, but the one under notice marks a departure and is thoroughly original in its treatment. Mr. Mosley has carefully abstracted from the celebrated Letters all the information relating to each species, and then arranged the latter alphabetically under the respective groups to which they belong. Thus it is possible to ascertain at once all that Gilbert White had to say regarding each mammal, bird, or other animal, or any plant, etc., while a reference is given to the particular Letter from which each item has been culled. Such a form of treatment will be welcomed by naturalists, even by some of those who already possess other copies of this famous work.

A POCKET BOOK OF BRITISH BIRDS. By E. T. M. Elms. (London: West, Newman, and Co., 1906.) Price 2s. 6d.

A pocket volume on British Birds which will afford a concise description of each species with a clear indication of their diagnostic characters would undoubtedly prove a useful *vade mecum* for the ornithologist. Unfortunately Mr. Elms' book only partially supplies this *desideratum*, and merely for those birds which are common or fairly common, the rarer species being omitted—a serious shortcoming. For each of our native birds a short and accurate description is given for the adults, but without a special reference to their "key" characters; while the immature birds—usually the most difficult to determine of all—are very inadequately treated. A definition of the status of each species is given; also a description of its haunts, habits, notes, food, nest, and eggs. The book is useful so far as it goes, and the pity of it is that it does not go further, as it might easily have done without materially adding to its small bulk.

WILD BIRDS AT HOME: Second Series. (London and Glasgow: Cowans and Gray, Limited.) Price 6d.

This second series, comprising a further sixty of Mr. Charles Kirk's photos of bird life, fully maintains the standard of excellence and interest of his former pictures. In this series Mr. Kirk has been particularly successful in securing photographs of several species in flight or feeding their young, and also some pretty portraits of chicks. A new feature has been added in the shape of some capital notes on the species figured; which have been contributed by Mr. George Girdwood, of Dumbarton, and add not a little to the value of the booklet.

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NEWFOUNDLAND FIN WHALE FISHING IN 1905.

By THOMAS SOUTHWELL, F.Z.S., ETC.

I HAVE received the Report of the Department of Marine and Fisheries of Newfoundland, and by permission of the editors of the "Annals," beg to append a few particulars of the season's Fin Whale Fishing, which will perhaps be of interest when read in connection with Mr. Haldane's excellent paper on the Shetland Fishery, which appeared in the last number of the "Annals."

The results in the past season have been very unsatisfactory, the total number of whales of various species killed being only 892, as compared with 1275 in 1904; and this notwithstanding the number of stations having been increased from 14 to 18. Of these, 460 were Finners; 161 Humpbacks; 263 Sulphurbottoms (*Balænoptera sibbaldii*); 2 Rudolphis (*B. borealis*); and 6 Sperm Whales. The three first species were about equally distributed over the fishing grounds, including Belle Isle and Labrador, but the only failure was on the west coast. As last season the Rudolphis Whales, which are rare in the Western Atlantic, were taken by a vessel working from a southern station, whereas the bulk of the Norwegian captures recorded in Mr. Cocks's reports took place north of 70° N. lat., if the species of these whales is rightly determined, it would appear to have a much more

southerly range in the Western Atlantic than in the Eastern, probably owing to climatic conditions. We hear nothing of *B. rostrata*, a common species on this coast. The six Sperm Whales were taken by vessels from the eastern stations. The sexes of the species are not given separately; but of the total of 892—470 were males and 422 females, the proportion of the latter being greater than in 1904.

Of the 18 vessels employed (five more than in 1904) the "Puma" was the most successful with 90 fish, and the "Neptune," fishing from Lark Harbour, was clean; this falling off in the number Mr. Way, the inspector of Whaling Factories, does not attribute entirely to a scarcity of whales, for whereas Snooks' Arm Station shows a deficiency of 49, Beaverton in the same bay had an increase of 12; but this discrepancy probably arose from one vessel being more fortunate in falling in with the whales than the other. The true cause of the falling off in the fishery was doubtless the unusual scarcity experienced of the minute crustaceans which form the favourite food of the whales; on the other hand Caplin were unusually plentiful, clearly indicating that the presence of this fish is not their chief attraction. Mr. Way does not regard the scarcity of whales in the past season as indicative of a permanent decline, but the tax of \$1500 per station has been disastrous.

It is unfortunate that the sex of the Sperm Whales was not given, for although the capture of females of this species, as pointed out by Mr. Haldane, is of very rare occurrence, it is not unprecedented, for, according to Anderson's "History of Iceland," of a school of 17 of these animals which came ashore at the mouth of the Elbe on 2nd December 1723, half (*sic*) were males and half females; and of thirty-two stranded on the coast of France in 1784 the majority are said to have been females. Mr. Haldane's statement that the Sperm Whales keep considerably to the west of the Hebrides, whereas those captured at Newfoundland all fell to the eastern stations, indicates that this deep-water species in its passage north follows the course of the Gulf Stream in mid-ocean, diverging to the north-west before reaching the Hebrides; in adopting this line of migration they would not only be most likely to obtain a better supply of their favourite food, but

the avoidance of the shore would account for their presence in the North Atlantic having remained so long undetected.

Mr. Haldane throws some fresh light on a long-debated subject—the position assumed by whales in the act of coition. Few opportunities present themselves of witnessing this act, the earliest account known to the writer, and seemingly the most probable, is that given by Paul Dudley in the “Philosophical Trans.” (No. 387, p. 256, 1725), who says, “Whales generate like neat cattle. . . . When the cow takes the bull, she throws herself upon her back, sinking her tail, and so the bull slides up, she then clasps him with her fins.” Anderson (1746) favours an upright position, in which he is followed by Pontoppiden (1752). Dr. Robert Brown (“P.Z.S.,” 1868) states that the Polar Whale couples “in an upright and not in a recumbent position,” and adds that, “in the month of August he has seen them in that position, with the pectoral fins depressed against each other’s bodies, and the male lashing the water with his tail,” apparently a rather difficult feat for him to perform, as in an upright position one would imagine his tail must be deeply submerged. In reply to my inquiries, my friend the late Capt. David Gray told me that, in the course of his long experience, he had only witnessed the complete operation three times, not for want of opportunities, but that their pre-occupation renders them at that time easy of approach, and they fall a ready prey to the boats; his description of what followed agrees in the main with that of Paul Dudley’s and Mr. Haldane’s informants. “There is a great deal of hobnobbing,” says Mr. Gray, “to go through, the male rubbing against the female and thrashing the water with his tail, at last the female turns on her back near the surface, and the pair clasp each other firmly with their fins, the male’s tail working at the surface. They take a considerable time to consummate the act.” Like contradictory accounts are given as to the mode of coition of the Narwhal, on which I have precise information from the same source, and I am inclined to the opinion that the differences arise from observers simply recording the incomplete overtures of the male, and their not having witnessed the final consummation.

REPORT ON SCOTTISH ORNITHOLOGY FOR 1905.

By JOHN PATERSON.

(Continued from p. 150.)

- UPUPA EPOPS (Hoopoe).—After a S.E. gale on the 13th April one (♂) was found dead at Dunrossness, Shetland. In the end of October or early November one shot at Onich, Argyll (p. 52), and one at Ballachulish on 11th November ("The Field," 11th November 1905).
- CUCULUS CANORUS (Cuckoo).—Earliest report Lendalfoot (Ayr) 12th April, and from twelve localities between 28th April and 1st May. Last heard 28th June, Mull. One found dead 23rd August, Arbroath. A few seen in September on the Fair Isle (p. 71).
- STRIX FLAMMEA (White or Barn Owl).—Young in nest, Edinburgh district, 8th August.
- ASIO OTUS (Long-eared Owl).—11th February, Unst (1); 15th September, Stemster (1); 3rd December, Lerwick (1); and 26th (1).
- A. ACCIPITRINUS (Short-eared Owl).—On Unst, 10th April (1); Balcomie (Fife), 8th September (1); Dunrossness, 13th November (1); Dunnet, 6th December (1).
- SYRNIUM ALUCO (Tawny Owl).—Berriedale by Thurso (1) on 13th April; Dunrossness, 16th November (1).
- NYCTEA SCANDIACA (Snowy Owl).—One on Unst on 4th April.
- SCOPS GIU (Scops-Owl).—One captured on the lighthouse rock, Unst, Shetland, about 20th August.
- PERNIS APIVORUS (Honey-Buzzard).—At North Berwick, 26th June, and another (or the same?) near Dunbar, shot 26th July (Evans).
- FALCO CANDICANS (Greenland Falcon).—One shot while attacking fowls at Spean Bridge, Inverness-shire, in March.
- F. SUBBUTEO (Hobby).—One reported from North Berwick on 20th June (W. M. Ingles).
- F. ÆSALON (Merlin).—On Unst, 14th January (1); Flannans, 15th April (1); Sule Skerry 26th (1); Flannans one killed, 3rd September, while destroying Wheatears on the lantern; another same day and place; Sule Skerry, 11th (1); Fair Isle, 11th and 12th, one, probably the same on each date; Flannans,

13th (2); Fair Isle, 4th October (1); and one at Sule Skerry on 8th October.

F. VESPERTINUS (Red-footed Falcon).—Flannans, 26th March, one (♂).

F. TINNUNCULUS (Kestrel).—Flannans, 9th March (1); 12th (2); Fair Isle, 16th September till 3rd October, several (♂) (p. 71).

P. GRACULUS (Shag).—At the Flannans on 24th January, gathering for nesting. One of a fine brown and white variety was obtained on the Flannans on 27th July ("A.S.N.H.," 1905, p. 244).

SULA BASSANA (Gannet).—At Corsewall on 17th January, large flock on the water; 4th and 19th March several small flocks at the Bell Rock; 21st, at the Flannans, hundreds; individuals and parties up to five in number at the Bell Rock from 28th November till 15th January. Most numerous during Mr. Clarke's visit to the Fair Isle early in September, and still present in reduced numbers till he left on 7th October (p. 72).

ARDEA CINEREA (Common Heron).—Many young hatched at Blair Drummond on 15th April, on 17th nest there with four young and two eggs. Odd birds up to six on 23rd September, and thereafter till Mr. Clarke's departure from Fair Isle (p. 72).

BOTAURUS STELLARIS (Bittern).—Two out of three shot near Ayr in February.

A. BRACHYRHYNCHUS (Pink-footed Goose).—Two gangs (a dozen and thirty) flew over Portmore Loch, Peeblesshire, on 5th October.

BERNICLA LEUCOPSIS (Barnacle-Goose).—At the Flannans on 5th April (24), wind N.; 12th (50) wind S.E.; 13th (hundreds), wind S.E.; 15th May, forty passing N.W.

B. BRENTA (Brent Goose).—At Delny (Ross) small numbers on 18th January. At Fairlie, Ayrshire, Mr. Robert Wilson saw one quite favourably on 2nd September. A biggish flock is reported from the Eden (Fife) on 26th December.

? ANSER CINEREUS (Grey-Lag Goose).—"Geese" (*sp.?*) went north from Inverbroom on 5th May, and 22nd July at same place (80-100) went south.

A. ALBIFRONS (White-fronted Goose).—In November at Dunrossness, one shot out of ten.

CYGNUS MUSICUS (Whooper Swan).—Seven frequented the Upper Clyde (Carmichael) on 1st February. Twenty appeared at Corsewall on 21st January, wind S.E. Small parties of "swans" passed Lerwick on 12th and 18th January and 21st February. At Unst on 14th January (3), and numbers heard passing N. on 10th March.

- C. BEWICKI* (Bewick's Swan).—One observed N.W. Mull on 19th October, and ninety-eight seen at Ardnava, Islay, on 6th December ("Zoologist," 1906, p. 74).
- TADORNA CORNUTA* (Common Sheld-Duck).—Bute, 13th May, two nests, 8 and 13 eggs respectively.
- A. STREPERA* (Gadwall).—Three seen on 17th October, in Kirkcudbrightshire, one (♂) being shot ("The Field," 4th November, 1905, p. 818).
- SPATULA CLYPEATA* (Shoveler).—Dundas, West Lothian, 26th February (♂); Burntisland, 21st April, returned to nesting locality (2); 26th April till June (and later?) Duddingston Loch.
- DAFILA ACUTA* (Pintail).—North Ronaldshay, 9th April (2); Frankfield Loch, near Glasgow, a pair on migration, 30th; Houlma Water, Shetland, 13th June. Bred at Dunrossness, Shetland, six young being hatched out on 4th June (p. 53).
- MARECA PENELOPE* (Wigeon).—From 9th September onwards small parties at Fair Isle (p. 72). Flock on the Eden on 16th September, seventy at Fairlie (Ayr) on 22nd.
- F. CRISTATA* (Tufted Duck).—Parent bird with young on Kilbirnie Loch, Ayrshire, in which county the nest has yet to be found as far as I know.
- F. MARILA* (Scaup Duck).—Thousands off shore Leith to Portobello, but not so numerous as during previous winter (Evans).
- CLANGULA GLAUCION* (Goldeneye).—Last date seen in N.W. Mull, 17th April. Auchinblae (Kincardine) four on 14th August.
- HARELDA GLACIALIS* (Long-tailed Duck).—March 26th at Crail in summer plumage, and on 3rd April "largest flock we have seen," small parties constantly flying N., light S.E. wind. In autumn at Crail, 1st October one (♀); 14th, North Berwick; 31st, Bell Rock (2).
- SOMATERIA MOLLISSIMA* (Common Eider Duck).—North Berwick, 28th February, very numerous; Bell Rock, 20th April, last seen. At same station on 21st September, ten, mostly young, wind S.E. light.
- CEDEMIA NIGRA* (Common Scoter).—At Crail, 2nd April, a good many. Off Aberlady Bay, 10th October, a good many (Evans).
- CE. FUSCA* (Velvet Scoter).—At Largo Bay, 6th May, a good many. At Bell Rock, three, 12th July; Crail, 16th August, a few; Tent's Muir, 16th September, about twenty; Dunrossness, 17th November, one shot; Sound of Lingay, off North Uist, 6th November (2), and what appeared a pair in Sound of Harris same date (p. 53).

- Æ. PERSPICILLATA (Surf-Scoter).—From 14th to 21st December one observed at Stromness (p. 117).
- MERGUS MERGANSER (Goosander).—Two in the Sound of Lingay off the north end of North Uist, 31st October (p. 53).
- M. SERRATOR (Red-breasted Merganser).—Lots at Largo on 29th April. At the Fair Isle single birds from 17th September till 7th October (p. 73). At Crail, on 29th September, a flock flying N.
- COLUMBA PALUMBUS (Ring-Dove).—Getting more numerous at Delny (Ross) on 17th February. In flocks again in Fife by 5th June, and unusually large flocks there in the autumn. Last heard cooing 22nd October, and young still in nest at Kirkliston 26th. In Bute by the 16th of April this species and the Stock-dove and Rock-dove all had eggs (Robert Wilson).
- TURTUR COMMUNIS (Turtle-Dove).—Lerwick, 4th December, one.
- TETRAO UROGALLUS (Capercaillie).—One (♀) shot at Teasses, Fife, 25th November, and another at Tarbolton Moss (Ayr) 14th December.
- COTURNIX COMMUNIS (Quail).—Breeding in the Fair Isle in July (p. 74).
- CREX PRATENSIS (Corn-crake).—Earliest records are Dalry (Ayr) 26th, Halmyre 27th, Beith 30th April; Dippen (Arran) 1st, Edinburgh 2nd, Thornliebank (E. Renfrew) 3rd, Broughton 5th May. In Mr. John Robertson's opinion there were less than half the usual number in East Renfrew in 1905. Heard at Beattock on 20th June, first "since 1901 when two nested in my hayfields" (Jas. Bartholomew). Last heard calling at Caldwell 22nd July. Several killed during a snowstorm at Balavil, Kingussie ("The Field," 6th January 1906, p. 36), in December.
- EUDROMIAS MORINELLUS (Dotterel).—An immature one at Pinkie, 24th April, and another (♂) near Denny, 13th May ("A.S.N.H.," 1905, p. 245).
- ÆGIALITIS HIATICOLA (Ringed Plover).—At Lerwick flocks on 22nd January and 15th October. Four at the Flannans 22nd July, one 23rd August. Small party, probably natives, left the Fair Isle in the third week of September (p. 74).
- CHARADRIUS PLUVIALIS (Golden Plover).—Returns to Carmichael (Lanark) 1st February. At Bridge of Allan, on 24th April, forty to fifty evidently migrants, and a nest there with a clutch eight days incubated. During autumn according to one correspondent unusual numbers in Fife, and another enters eleven at the East Neuk on 1st September, and in the latter half of that month at

Cambo, Boarhills, and Babbit Ness enormous flocks. Many appeared on 14th at Fair Isle, remaining a day for food and rest (p. 74). At Cardross (Dumbarton) on 18th November in frost "swarming." At Corsewall, 18th December, large flocks.

SQUATAROLA HELVETICA (Grey Plover).—A dozen reports all refer to August-November. Eden, small flock in summer plumage 15th August; Dunbar, 7th September, three or four all apparently young (Evans); Troon, 23rd September (2), 7th October (2); North Berwick, 20th September, flock; Gladhouse Reservoir (Moorfoots) 15th October (1) (Evans); Fairlie (Ayr) 21st October (2), 1st November (1); Largo, 4th November (1).

VANELLUS VULGARIS (Lapwing).—No important movements are reported. Returned to Carmichael 1st February, many, apparently migrants, at Duddingston 7th, fifty-six at Delny (Ross) on 2nd, and "daily increasing" now (17th), on breeding grounds at Auchinblae (Kincardine) 15th, returned to Halmyre 5th March, and spring call first heard in Edinburgh district on 18th. In Fife on 5th June in flocks again. On the Fair Isle on 12th October a "very large flock" (p. 75).

STREPSILAS INTERPRES (Turnstone).—Largo, 28th April, flock in summer plumage; 14th May (6) in Bute; N.W. Mull, 17th May (10); Aberlady, 22nd July (1) (Evans); Bute, Ettrick Bay, 5th August (6), and a few in St. Ninian's Bay next day; Sule Skerry, 12th August, a flock; Fairlie (Ayr) 19th (8); N.W. Mull, 23rd August, a score.

SCOLOPAX RUSTICULA (Woodcock).—South Bute, 2nd April, two nests; Uyea, Shetland, two half-grown, on 3rd August ("A.S.N.H.," 1905, p. 245); unusual number at Dunrossness early in November. First in Fair Isle, 16th October (p. 75).

GALLINAGO MAJOR (Great Snipe).—One shot on River Ythan, 5th September ("Zoologist," 1905, p. 466). One shot and another seen at Stronsay, Orkney, 12th September (p. 54).

G. CELESTIS (Common Snipe).—At the Flannans on 27th February, about thirty, wind N.W.; those that were at Sule Skerry all winter disappeared on 28th April. First heard drumming on 9th March at Unst, where many appeared with a S.E. wind. At the Fair Isle they were everywhere on 6th September, and there were decided movements on 18th and 25th September.

G. GALLINULA (Jack Snipe).—First seen on 19th September at the Fair Isle, it was in all parts of the island next day. On 22nd September one was shot at Dougalston, Stirling ("The Field," 30th September, 1905).

- TRINGA ALPINA* (Dunlin).—At Crail, 3rd October, a whole small flock still in summer plumage. A few still inland at Balgray Dam (E. Renfrew), on 12th November.
- T. MINUTA* (Little Stint).—Balcomie (Fife), 2nd September (1), also on 11th and 28th, and 1st October (Godfrey and Barbour); Balgray (E. Renfrew), 2nd September (2); 3rd (4), an addition to East Renfrew fauna (Robertson); Dunbar, 7th (3), this year's birds (Evans); Fair Isle, 10th September (1) (p. 76); Crail, 1st October (1); 2nd, a few (Misses Rintoul and Baxter).
- T. SUBARQUATA* (Curlew-Sandpiper).—Dunbar, 7th September, several (Evans).
- T. STRIATA* (Purple Sandpiper).—The Flannans, 8th January (20); 10th March, several; Girvan to Turnberry, two flocks of fourteen each, on 23rd April; Flannans, 27th November (8); 3rd December (about 20). First at the Fair Isle on 2nd October (p. 76).
- T. CANUTUS* (Knot).—Fairlie (Ayr), 11th February, about sixty (Rob. Wilson); 22nd July, Aberlady (22), all grey plumage, but not this year's birds (Evans); 19th August, Fairlie (40) (Wilson).
- CALIDRIS ARENARIA* (Sanderling).—Aberlady Bay, 22nd July, six in faded summer plumage, rather wild (Evans); Eden, 15th August, flocks in all plumages; Prestwick, 9th September (8). Fair Isle, four on 9th and 10th September, and one on 12th (p. 76).
- MACHETES PUGNAX* (Ruff).—Balgray Dam (E. Renfrew), 19th August (1) (Robertson); one or more small parties till 12th September, at Fair Isle (p. 76). Island of Coll, about 16th September (1). Very numerous at Stronsay, Orkney, 25th September (p. 54).
- TOTANUS HYPOLEUCUS* (Common Sandpiper).—Busby (Lanark), 9th (1); Beith, 12th; Caldwell, 15th; Broughton, 16th; and Halmyre, same date, plentiful. At Aithsting, Shetland, 13th June, eggs chipping. Single birds at first fairly common on Fair Isle between 2nd and 19th September (p. 76). Balgray (E. Renfrew), 10th September (2).
- T. OCHROPUS* (Green Sandpiper).—Rouken Glen (E. Renfrew), 15th April (Robertson), one. Leadburn (Midlothian), 15th August (Clarke), one. At Fair Isle, 2nd to 8th September, one, perhaps two, not previously recorded for Orkney or Shetland (p. 76). Garscadden, near Glasgow, one in December.
- T. CALIDRIS* (Redshank).—Carmichael, 22nd February, returned; Halmyre, 12th March, three pairs; Cloverhill, Broughton, 17th; Auchinblae (Kincardine), 29th, on breeding ground. At Radernie (Fife) on 12th May, one with a pure white tail.

- T. CANESCENS* (Greenshank).—Kilchattan Bay, Bute (1), on 2nd April; Sule Skerry, one killed at light, 13th; Balgray (E. Renfrew), first appeared 19th August, and last seen 29th October; Sule Skerry, one on 19th September.
- LIMOSA LAPPONICA* (Bar-tailed Godwit).—Fairlie (Ayr), 2nd January (1); Aberlady Bay, 22nd July, fifteen, three practically still in summer plumage, the others partially so (Evans); 15th and 21st August, flocks at the Eden (Fife).
- L. BELGICA* (Black-tailed Godwit).—One at Ythan Estuary on 12th September ("Zoologist," 1905, p. 466).
- NUMENIUS ARQUATA* (Common Curlew).—Some at Blackwood (Lanark) by 22nd February. Auchinblae, on breeding ground, on 28th March. Nesting place of this species and one egg found in Fife on 1st May. The egg was on the bare ground. On returning on 10th full clutch of eggs found and nicely made nest of dry grass. Unusual numbers observed in autumn in Fife. Passing S.W. over Glasgow, 20th September. Fairly numerous in passage in first week of September at Fair Isle (p. 77).
- N. PHÆOPUS* (Whimbrel).—Reports of appearance are general in May between 7th and 18th. Aberlady Bay, 22nd July (3) (Evans); Crail, 16th August (4); Eden, 21st August, a good many. Single birds at Fair Isle at passage on 4th, 11th, and 15th September (p. 77). Five or six pairs resident at St. Kilda ("A.S.N.H.," 1905, p. 202).
- STERNA CANTIACA* (Sandwich Tern).—North Berwick, 30th April; Elie, 16th May, one or two; small numbers in East Fife till 16th September, and one at Crail, 2nd October. Dalmeny, 4th November, one ("Zoologist," 1905, p. 465).
- S. FLUVIATILIS* (Common Tern).—Largo Bay, 21st April, lots, and large flocks at Bell Rock, 6th and 27th May, and indeed "terns" generally reported round the coasts in May (13th at Aukerry, being ten days earlier than last year). Lerwick, "terns" disappeared 15th September, and left Sule Skerry, 20th August.
- S. MACRURA* (Arctic Tern).—Flocks appeared at Lerwick on 28th May, three days later than last year.
- S. MINUTA* (Little Tern).—Numerous at Elliot, Arbroath district, on 14th May.
- XEMA SABINII* (Sabine's Gull).—Skerryvore, 10th February, one (immature).
- LARUS MINUTUS* (Little Gull).—Dunbar, 20th January, one, immature, shot ("A.S.N.H.," 1905, p. 119).

- L. RIDIBUNDUS (Black-headed Gull).—Assumes hood, 23rd February, Kirkliston, Edinburgh, 26th. Pair apparently nesting at Loch of Huxter, Whalsay.
- L. FUSCUS (Lesser Black-backed Gull).—Bute (2), Glasgow Harbour (1), on 14th March; Delny (Ross), on 7th April (1), the first seen this year; N.W. Mull, 10th April, first appearance on way to nesting ground. "I have failed to identify it as resident in winter in N.W. Mull" (MacDonald). Not seen on the Fair Isle after 3rd September (p. 77).
- L. MARINUS (Great Black-backed Gull).—At Tent's Muir on 23rd September, ninety-three birds, including a few immature (Godfrey and Barbour).
- L. GLAUCUS (Glaucous Gull).—At Unst, 19th January, old and young, many seen, two shot. At North Berwick, 11th November, one (*juv.*); 12th, Sule Skerry, one.
- L. LEUCOPTERUS (Iceland Gull).—Reports of single examples at the Flannans on 24th January (*ad.*), 28th February (*juv.*), 10th September, 6th November (*juv.*), 13th. One at Unst, 10th February. One at Crail, 1st April.
- RISSA TRIDACTYLA (Kittiwake Gull).—At the Flannans, 5th March (50); 10th (hundreds). In numbers at the Fair Isle till 7th October (and thereafter probably), chiefly adults (p. 78).
- MEGALESTRIS CATARRHACTES (Great Skua).—Unst, 11th April, several, wind S.E. (first eggs 24th May, at least thirty-four nests with eggs on 1st June) ("A.S.N.H.," 1905, p. 182). Foula, 17th April ("Shetland Times").
- STERCORARIUS CREPIDATUS (Arctic Skua).—Many at Unst, 13th April. On ten occasions in East Fife between 3rd July and 3rd October. Never more than three seen at a time. At Kincardine-on-Forth, on 18th September, one shot out of six.
- ALCA TORDA (Razorbill).—At the Flannans on 3rd April, a great number. Left Sule Skerry about 25th July. An immature one on the Waulkmill Glen Dam (E. Renfrew). At the Bell Rock, on 13th to 15th October, continuous flocks passing south.
- URIA TROILE (Guillemot).—At Corsewall large flock on water on 6th February. At the Flannans, a few, on 14th to 15th February. Not again seen there till 2nd March, and appeared then in hundreds. At Crail, on 2nd April, countless small flocks all flying north. Passing south at the Bell Rock in continuous flocks on 13th and 15th October.
- URIA GRYLLE (Black Guillemot).—Unst, 10th June, fresh eggs found.

MERGULUS ALLE (Little Auk).—Lerwick, 1st January, one found dead; 22nd, one in the harbour; Thurso district, 11th, one; North Queensferry, 14th, one; Dunbar, 22nd February, one ("A.S.N.H.," 1905, p. 119); Bell Rock, 18th, four. One picked up alive in the end of December near Kilconquhar. When put into a tub it dived easily, using its wings under water; it also swam about, at times rolling its body from side to side. It seemed quite uninjured, and was very pugnacious, holding on to a hand or glove, and worrying it like a dog. One at Fair Isle on 8th November (p. 79).

FRATERCULA ARCTICA (Puffin).—On 17th April great numbers at Sule Skerry (wind S.E.), landed 19th; Unst, 18th, great numbers (wind E.); Flannans, 24th, hundreds (wind E.). Sule Skerry, 7th August, getting fewer since this date, "a score still here, 1st September."

COLYMBUS SEPTENTRIONALIS (Red-throated Diver).—Latest in first half of year, one at Bute on 1st May. Reported in September from four Fife localities between 14th and 29th.

PODICIPES FLUVIATILIS (Little Grebe).—Reported building, Kirkliston, 16th April; sitting, Edinburgh, 25th; "trilling" at Kilconquhar, 20th September.

P. AURITUS (Slavonian Grebe).—One, perhaps two, pairs on the Fair Isle, 4th and 6th October (p. 80).

PROCELLARIA PELAGICA (Storm-Petrel).—One found in nest on 10th June at Flannans, and on 16th October a young one in down—"it wont leave its hole for three weeks."

PUFFINUS ANGLORUM (Manx Shearwater).—At Skerryvore, several seen passing most of the day in a southerly direction, on 18th March.

FULMARUS GLACIALIS (Fulmar).—At the Flannans, 13th March (♂); Dunnet, 3rd June, twenty-two pairs breeding this season; 5th, Fitful Head, large numbers; sitting at Noss, Shetland, on 8th June. One found dead on Belhaven Sands on 26th September. Thirty pairs nesting at Fitful Head ("A.S.N.H.," 1905, p. 246).

Acknowledgment is due to the following contributors:—In the Northern group of localities, John R. Lawrence, Pentland Skerries; John Grant and others, the light-keepers at Sule Skerry; Robert Brown and Dugald M'Millan, Aukerry; T. E. Arthur and Kenneth Sinclair, North Ronaldshay; W. Eagle Clarke, the Fair Isle; John S. Tulloch, Leog, Lerwick; Robert H. Bell, Lerwick; T. Henderson, Jr., Dunrossness; Dr. T. Edmonston Saxby, Unst, Yell, and Fetlar. On the east of Scotland—Lewis Dunbar, Thurso; Ewen Kennedy, Delny, East Ross; John Milne, Auchinblae, Kincardineshire; the keeper of the Bell Rock Lighthouse

per Robert Clyne, Signal Tower, Arbroath; Dr. Thomas F. Dewar, Arbroath; Robert Godfrey and George B. Barbour, East Neuk of Fife; D. J. Balfour Kirke, Burntisland; William Binnie, Rev. H. N. Bonar, and William Evans, Edinburgh; Sydney E. Brock, Kirkliston; Rev. William Serle, Duddingston; W. M. Ingles, North Berwick; David G. Laidlaw, Halmyre, West Linton; A. C. Gairns, Broughton, Peeblesshire; Leonora J. Rintoul, Largo, and Evelyn V. Baxter, Gilston, Colinsburgh. In the west and south-west—Lady Fowler, Inverbroom; William Begg and Robert Anderson, Flannan Islands; D. MacDonald, Mull; Cecil H. Bisshopp, Oban; James Tomison, Skerryvore; Robert Wilson, John Robertson, K. and R. M. Buchanan, and the writer, Glasgow; John Craig, Beith; Charles Berry, Lendalfoot; Dr. Fullarton, Lamash; Rev. J. D. W. Gibson, Carmichael, Lanark; Henry Jamieson, Corsewall Lighthouse; James Bartholomew, Beattock; Hugh S. Gladstone, Thornhill.

1150 CATHCART ROAD, GLASGOW.

ON THE OCCURRENCE OF THE RED-RUMPED SWALLOW (*HIRUNDO RUFULA*) AT FAIR ISLE: A NEW BIRD TO THE BRITISH FAUNA.

By WM. EAGLE CLARKE.

THE alien element contained in the British avi-fauna, already phenomenally strong, is continually receiving additions. Indeed, the possibilities as to what European bird of migratory habit may not visit our shores seem to be almost limitless. The latest recruit to the ranks of our foreign legion is an interesting one, and the scene of its advent in Britain is remarkable on account of the remoteness of Fair Isle from its native haunts.

On the 2nd of June last, Fair Isle was visited by a number of migratory birds *en route* for their more northern summer haunts. These birds of passage included Swallows, Bramblings, Tree Pipits, Spotted Flycatchers, Red-backed Shrikes, Cuckoos, Dunlins, and others. An interesting stranger was also present among these visitors, for, flying in company with a party of the Common Swallow, my valued correspondent, Mr. George Stout, of Busta, observed one with a

red patch on the lower back. Some ten days afterwards this bird was found by Mr. Stout dead and much decomposed, but was fortunately sent to me for identification, when I found it to be an adult example of the Red-rumped Swallow, the *Hirundo rufula* of Temminck, a bird which has not hitherto been detected in our islands.

This handsome species is a regular summer visitor to south-eastern Europe, where it ranges as far west as Italy, but only occurs as a straggler westwards, having been occasionally met with in Malta and France. Northwards it has seldom been observed beyond the Alps, though it has once visited Heligoland, namely, on the 30th of May 1855, when a single bird was obtained which passed into the collection of that prince among bird-observers, Heinrich Gätke, as related in "Die Vogelwarte Helgoland" (pp. 436-438). Eastwards it ranges through Asia Minor and Palestine to Persia, Afghanistan, and Turkestan; and in winter it is found in Abyssinia.

Mr. Whitaker, in his valuable and interesting work on the "Birds of Tunisia" (vol. i. p. 186), tells us that the Arab bird-catchers occasionally catch one or two when netting Common Swallows in the spring; and though not abundant, it is probably less rare than it is generally supposed to be, but escapes notice owing to the difficulty in distinguishing it from the ordinary species. Mr. Whitaker also informs us that this bird is resident and abundant in southern Morocco.

Heligoland has hitherto formed the northern limit of its wanderings in Europe; and that it should have ventured to the remote Fair Isle, and made that the Ultima Thule of its peregrinations, is both remarkable and inexplicable, as, indeed, are many other facts connected with the movements of birds.

Hirundo rufula, though having a general resemblance to our familiar summer guest, may at once be known by the peculiarity to which it owes its name, to wit, the possession of a conspicuous band of rufous chestnut across the lower portion of its back. It has also a stripe over the eye and a broad band on the nape of the same rufous colour; while the under surface of its body is buff, tinged with chestnut, and has a striated appearance, owing to the shafts of the feathers

being blackish. The tail, however, is less ornate than in the Common Swallow, since it is plain greenish black, and thus lacks the pretty creamy white spots that adorn most of the rectrices of *Hirundo rustica*.

In the "Zoologist" for 1853 (p. 3753) Mr. Rodd reported that this species had been seen by Vingoe near Penzance towards the end of the summer of 1852; but from the description given there can be little doubt that the bird observed was not *Hirundo rufula* at all, but was most likely *H. savignii*, an allied species. In Rodd's "Birds of Cornwall" the facts are merely mentioned under *Hirundo rustica*, and the bird is simply alluded to as a "Rufous Swallow."

THE ROYAL SCOTTISH MUSEUM, EDINBURGH.

THE DIPTERA OF FAIR ISLE.

By PERCY H. GRIMSHAW, F.E.S.

IN continuation of the articles which have appeared recently in the "Annals" dealing with the Fauna of Fair Isle, and contributed by the various specialists who had the opportunity of examining the material obtained by Mr. Eagle Clarke, I have pleasure in recording the following species of Diptera, a complete series of which has been selected for the collection in the Royal Scottish Museum. Although there is nothing of striking rarity in the list, yet it may be interesting as showing what variety may exist within such a small area. The month of September, moreover, is not a favourable time for this order of Insects, and had Mr. Clarke visited the island in June or July no doubt the list could have been much extended. I have thought it advisable to state in each case the actual number of specimens obtained.

Family MYCETOPHILIDÆ.

1. EXECHIA FUNGORUM, Deg.—One specimen.

Family LIMNOBIIDÆ.

2. ERIOPTERA TRIVIALIS, Mg.—One male.

Family TIPULIDÆ.

3. *T. OBSOLETA*, *Mg.*—Five males.
4. *T. CONFUSA*, *V. d. Wlp.*—Two males and eight females.
5. *TIPULA OLERACEA*, *L.* (the "Common Crane-fly").—Two males and five females.

Family EMPIDÆ.

6. *RHAMPHOMYIA VARIABILIS*, *Ztt.*—One male and three females.
Apparently a widely distributed species in Scotland.
7. *R. FLAVA*, *Fln.*—One specimen, sex undetermined.

Family SYRPHIDÆ.

8. *PLATYCHIRUS MANICATUS*, *Mg.*—One female.
9. *P. ALBIMANUS*, *Fab.*—One female.
10. *RHINGIA CAMPESTRIS*, *Mg.*—Two females.
11. *ERISTALIS TENAX*, *L.*—Three males and one female.
12. *E. ARBUSTORUM*, *L.*—Thirteen males and eight females.
13. *HELOPHILUS PENDULUS*, *L.*—Three males and one female.

Family TACHINIDÆ.

14. *SIPHONA GENICULATA*, *Deg.*—Three males and three females.
15. *ONESIA SEPULCHRALIS*, *L.*—Six males and two females.

Family MUSCIDÆ.

16. *MYIOSPILA MEDITABUNDA*, *Fab.*—Twenty-one males and eleven females.
17. *CALLIPHORA ERYTHROCEPHALA*, *Mg.* (the "Common Blue bottle"). Sixteen males and twenty-three females.
18. *EUPHORIA CORNICINA*, *Fab.*—Twelve males and fifteen females.

Family ANTHOMYIIDÆ.

19. *HYETODESIA INCANA*, *Wied.*—One female.
20. *SPILOGASTER DUPLICATA*, *Mg.*—Thirty-two males and thirty-four females.
21. *HYDROTÆA DENTIPES*, *Fab.*—Two males and five females.
22. *DRYMIA HAMATA*, *Fln.*—Two females.
23. *HOMALOMYIA CANICULARIS*, *L.*—One male and three females.
24. *AZELIA ZETTERSTEDTI*, *Rnd.*—One male.

Family CORDYLURIDÆ.

25. SCATOPHAGA STERCORARIA, *L.*—Sixty-nine males and fifty-eight females.
26. *S. SQUALIDA*, *Mg.*—Two males and three females.
27. *S. LITOREA*, *Fln.*—One male and two females.
28. *S. VILLIPES*, *Ztt.*—Five males and five females.

Family PHYCODROMIDÆ.

29. FUCOMYIA, *sp.*—Three males and two females not yet identified.

Family SAPROMYZIDÆ.

30. LAUXANIA ÆNEA, *Fln.*—Seven specimens.

Family PIOPHILIDÆ

31. PIOPHILA *sp.*—One specimen.

Family EPHYDRIDÆ.

32. HYDRELLIA GRISEOLA, *Fln.*—Seven specimens.

Family DROSOPHILIDÆ.

33. SCAPTOMYZA GRAMINUM, *Fln.*—Three specimens.
34. DROSOPHILA *sp.*—One specimen in bad condition.

Family PHYTOMYZIDÆ.

35. CHROMATOMYIA OBSCURELLA, *Fln.*—One specimen.

Family BORBORIDÆ.

36. BORBORUS EQUINUS, *Fln.*—Thirteen specimens.

In addition to the flies above recorded, Mr. Clarke obtained about a hundred and fifty specimens of *Anthomyiide* belonging to obscure species of *Phorbia*, *Anthomyia*, etc. Until my knowledge of these difficult genera is more complete it is impossible for me to say any more about them.

ON THE OCCURRENCE OF A NEW BRITISH FLY (*TRICHOCERA MACULIPENNIS*, Mg.) IN THE FORTH DISTRICT.

By PERCY H. GRIMSHAW, F.E.S.

DURING a visit to a coal mine on the 19th of July this year, my enthusiastic friend, the Rev. James Waterston, came across a single female specimen of *Trichocera maculipennis*, Mg., clinging, *in absolute darkness*, to the wet surface of the side of a gallery 168 feet below the surface. This interesting discovery was made near the foot of the shaft at the Croft Head Colliery, Fauldhouse, and is worthy of record inasmuch as the species has not hitherto been recognised as a native of Britain. A year or two ago, however, I saw a specimen of the same species from a cave in Derbyshire, but under circumstances which prevented my alluding to the fact. This second occurrence, therefore, enables us to regard this distinct species of "Winter Midge" as an undoubted member of our Fauna. The flies of the genus *Trichocera* possess interesting habits, being lovers of cold.

The common species *T. hiemalis*, Deg. and *T. regelationis*, L. both occur in the depth of winter, and, according to Mr. Eaton ("Nature," April 14, 1881), fly principally during a temperature of 40° to 45° Fahrenheit. *T. regelationis* and *T. maculipennis* are both recorded by continental observers as occurring in mines and caves, the former often at a depth of 100 fathoms.

Trichocera maculipennis, Mg., may be readily distinguished from all other members of the genus by the fact that the wings are decidedly spotted (see figure), the spots being due to a conspicuous clouding of the base of the radial (2nd longitudinal) vein and also the marginal and small cross veins; also a less conspicuous clouding on the discal and posterior cross veins. So far as my experience goes, no other species of the genus shows more than the slightest



trace of clouding on the discal and posterior cross veins, while the base of the radial vein is always clear. In the present species, moreover, the whole insect is larger, the body being (in the female), $7\frac{1}{2}$ mm. in length and each wing 9 mm.

ON SOME SCOTTISH SIPHONAPTERA.

By JAMES WATERSTON, B.D., B.Sc.

IN August 1905 Mr. Godfrey handed me a couple of Fleas from Orkney, and later in the month, while I was taking *Stenopteryx hirundinis*, Leach, at Coldingham, a number of those insects came under observation. The Hon. N. C. Rothschild, to whom they were sent, urged me strongly to go on collecting, and the results of a year's work are embodied in this paper.

To Mr. Rothschild's kindness in identifying my captures I am much indebted. I also take this opportunity of thanking very heartily the many friends who have sent nests or small mammals for examination, and in particular Mr. Rupert Cochrane, without whose help the list would be considerably poorer. During the year most attention has been paid to the genus *Ceratophyllus*, *Curt.*, and there chiefly to forms attacking birds. In June an effort was made to gain some knowledge of the species on *Microtus orcadensis*. Mr. George Ellison, Liverpool, visited Orkney later on the same errand, and has very kindly allowed me to incorporate his records here.

In mentioning the following species I have tried to give as many localities and hosts as possible, rather than to multiply records.

PULEX, *L.*

IRRITANS, *L.*—vii.-viii. '05: St. Kilda, in houses, etc. Mr. Fraser later sent a number of fleas from dogs—all proved to be of this species. x. '05: Model Lodging House, Edinburgh. vi. '06: Kinbuck, Perthshire. "Swarming in houses." N. B. Kinnear, who forwarded a ♂.

CANIS, *Curt.*—x. '05: several on slides in University Laboratory, no data (Dr J. H. Ashworth). 25, viii. '06: a single ♂, house in Edinburgh.

CUNICULI, *Dale* (= *goniocephalus*, Taschb.).—vi. '04: *Lepus cuniculus* from Forfarshire, in Laboratory, Edinburgh University (T. J. Anderson). I, v. '06: Common on *L. cuniculus*, Colinton.

CERATOPHYLLUS, *Curt.* (= *Trichopsylla*, Kolen).

FASCIATUS, *Bosc.*—26, iv. '06: ♀ on *Mus sylvaticus*, Colinton. 8, vi. '06: *Mus decumanus*, on shore, Tankerness, near Kirkwall, Orkney, 4 ♂♂, 8 ♀♀.

SCIURORUM, *Bouché.*—26, v. '06: ♂ and ♀♀ Hillend, Midlothian, nest in spruce, unoccupied—apparently of *Turdus viscivorus*.

MUSTELÆ (*Wagner*), *Dale.*—viii. '05: ♀, on *Microtus orcadensis*, Millais, near Stromness (Robert Godfrey, see "A.S.N.H." April 1906).

PENICILLIGER, *Grube.*—11, vi. '06: ♀ in nest of *M. orcadensis*, taken by Miss Annie Allan, Burwick, S. Ronaldshay, Orkney. 29, vi. '06: ♀, *Microtus arvensis*, Lochmaddy, N. Uist, Outer Hebrides, N. B. Kinneir. vii. '06: ♂ from *M. orcadensis*, taken near Stromness, Orkney, by George Ellison, Liverpool. Later (18, viii. '06) the same gentleman sent me 3 ♀♀ of this species. In all Mr. Ellison secured 20 examples.

WALKERI, *Rothsch.* (see "Ent. Mo. Mag." Oct. 1902).—I have received a ♂ and a ♀ from my friend, Mr. Percy H. Grimshaw. Unfortunately there are no data attached to these specimens. They are, however, almost certainly from Scotland and taken during the present summer.

GALLINÆ, *Schrk.*—At Colinton from the following nests:—*Turdus musicus*, ♂; *Passer domesticus*, several 7, v. '06. *Ligurinus chloris*, 11, v. '06. *Corvus monedula*, one ♂, 24, v. '06; and on same date ♂ from nest of *Gallus domesticus*. Orkney, *Alauda arvensis*, Burwick, ♂, 11, vi. '06. *T. merula*, St. Margaret's Hope, S. Ronaldshay, ♀. Mr. Ellison has taken an example (sex not stated) at Stromness, from *M. orcadensis*. I have to thank Mr. Rupert Cochrane for the following:—♀, *Alauda arvensis*, Aberlady, 13, vi. '06; a few, *Parus major*, Glencorse, 23, vi. '06. 3 ♀♀, nest of *Muscicapa grisola*, Gorebridge, 17, vii. '06. Also from nests of *Chelidon urbica*, Dunlaverock, Coldingham, 24, ix. '06. The original owners had been evicted by *Passer domesticus*. Taken again at Gladhouse, Midlothian, 13, viii. '06: under the same circumstances.

INSULARIS,¹ *Rothsch.*—Described by Mr. Rothschild in "Ent. Mo. Mag." 1906, p. 59. Colinton: common in nest of *Corvus monedula*, 7, v. '06; and again, *ibid.*, 24, v. '06; one ♂ in

¹ One of the Colinton ♀♀ is the type.

company with *C. Gallinæ*, 9, vi. '06. Nest of *Larus argentatus*, Burwick, 4 ♂♂, 6 ♀♀, 17, vi. '06. Nest of *Fulmar glacialis*, St. Kilda, one ♂. A ♀ given me by Mr. Hewitt, from St. Kilda, proves to be of this species.

FRINGILLÆ, *Ivek.*—11, v. '06: *Passer domesticus*, very abundant, Colinton. 17, vii. '06: *P. domesticus*, manse, Gorebridge, ♂.

GAREL, *Rothsch.*—Tankerness, Orkney, in the following nests:—*Somateria molissima*, ♂ and ♀; *Gallinago cælestis*, 6 ♀♀; *Lagopus scoticus*, ♂ and 2 ♀♀, 8, vi. '06. Nest of *Gallinula chloropus*, Arniston, forwarded by Mr. Alex. Bennet. Several bred, 26, vii. '06.

FARRENI, *Rothsch.*—Described by Mr. Rothschild "Ent. Mo. Mag." October 1905, August 1905, 7 ♂♂ and 7 ♀♀. Nest of *Chelidon urbica*, Dunlaverock, Coldingham. One of these ♀♀ is the type. This year (24, ix. '06) Mr. R. Cormack sent me three nests from the same house. In them *Farreni* was abundant. Swarming in nests of same host, Gladhouse, Midlothian, 13, viii. '06.

HIRUNDINIS, *Curt.*—Abundant in nest of *Chelidon urbica*, Gladhouse, Midlothian, 13, viii. '06.

STYX, *Rothsch.*—20, vii. '06: nest of *Cotile riparia*, Morningside, swarming (R. C.).

GALLINULÆ, *Dale* (= *Newsteadi*, *Rothsch.*).—The most abundant flea on passerines in my experience. In Midlothian from the following localities and hosts:—Colinton: *Turdus musicus*, *T. merula*, *Accentor modularis*, *Erithacus rubecula*. Between Hill-end and Flotterstone: *Ligurinus chloris*, *T. viscivorus*, *Motacilla lugubris*, *Troglodytes parvulus*. Glencorse Pond: *Gallinula chloropus*, *Phylloscopus trochilus* (R. C.), *Parus major* (R. C.). Gorebridge: *Muscicapa grisola*, 12, vii. '06; *Ruticilla phœnicurus*, 17, vii. '06. I have also bred it in numbers. Braid Hills, *Anthus pratensis*. Orkney. *T. merula*, St. Margaret's Hope; *Sturnus vulgaris*, near Kirkwall; *Alauda arvensis*, Tankerness and Burwick; *Lagopus scoticus*, Tankerness. A few bred from nest of *Gallinula chloropus*, Arniston (Alex. Bennett), 26, vii. '06. Abundantly bred from nest of *Fringilla cœlebs*, from Inchture, Perthshire, July–August, 1906 (J. H. M.).

TYPHLOPSYLLA, *Taschb.*

AGYRTES, *Heller.*—26, iv. '06: on *Mus sylvaticus*. Colinton, 5 examples. 11, vi. '06: Nest of *Alauda arvensis*, Burwick, one ♀. Also abundant in nest of *Microtus orcadensis*, taken by Miss Allan. 7, vii. '06; Nest of *Microtus* sp., Aberlady

(R. C.) common. Mr. Ellison took 7 specimens this summer near Stromness from *M. orcadensis*.

DASYCANEMUS, *Rothsch.*—29, v. '06: abundant in unoccupied nest of *Sorex araneus*? in bank near Hillend.

SORECIS, *Dale* = (*Gracilis* *Taschb.*).—7, vii. '06: on *Sorex araneus*, 2 ♂♂, (R. C.).

PENTACANTHUS, *Rothsch.*—26, iv. '06: on *Mus sylvaticus*, Colinton, ♂.

CTENOPSYLLUS, *Kolen.*

MUSCULI, *Dugés.*—viii. '05: ♀ from *Mus musculus*, Stromness, (Robert Godfrey, "A.S.N.H.," April 1906). 2, i. '06: Many from *M. musculus*, Edinburgh.

EDINBURGH.

THE TARDIGRADA OF THE FORTH VALLEY.

(SECOND PAPER.)

By JAMES MURRAY.

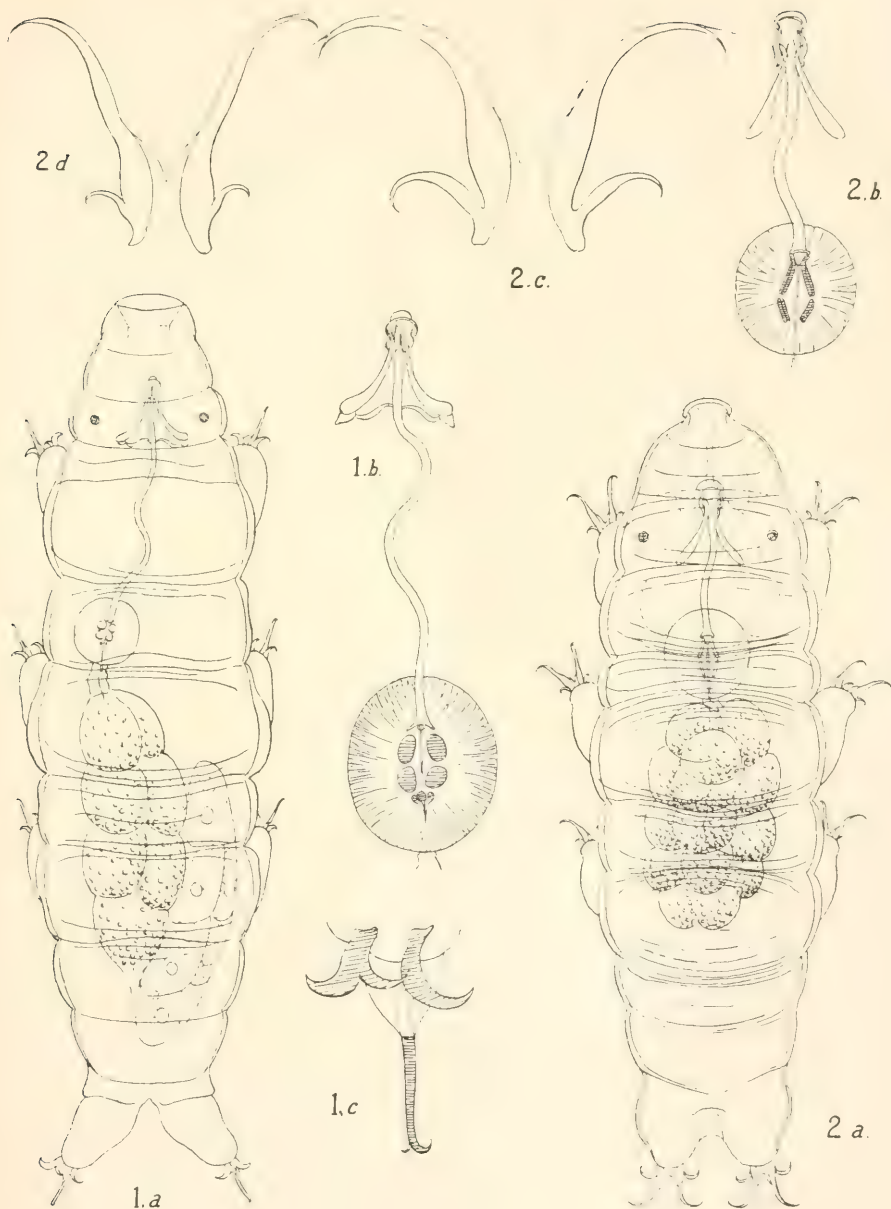
PLATE V.

SINCE the first list of Forth Tardigrada appeared in this journal in July 1905, some half-dozen additional species have been found in the district, including an undescribed species of the genus *Diphyscon*, and some new localities fall to be noted for the species previously found. As in the previous list, all the species here mentioned were collected by Mr. Wm. Evans.

Genus ECHINISCUS.

No further species of this genus has been identified, but two forms have been found which cannot be referred to any known species. These are shortly described for the sake of future reference, but they are not named because there is at present so much uncertainty as to the specific value of many points of structure in *Echiniscus*.

Echiniscus sp.?—Length $\frac{1}{10}$ inch, relatively broad, plates 9, granules moderate, lateral setae 5, at posterior angles of head, shoulder, first and second paired and lumbar plates, progressively longer from second to fifth, head seta also long; dorsal processes a small spine on posterior edge of each plate of first and second pairs; fringe of sharp teeth on last leg; inner



1, a. *Diphyscon oculatum*, n. sp.

1, b. The same; teeth, gullet, and pharynx.

1, c. „ claws of last leg.

2, a. *Macrobiotus macronyx*, Doy., form.

2, b. The same; teeth, gullet, and pharynx.

2, c. „ claws of last leg.

2, d. „ claws of first leg.

claws with strong decurved barbs, none on outer claws; palp on first leg.

The species is very close to *E. creplini*, Schultze. The chief differences are the *fringe* and the *barbs* of the inner claws, and it is a question whether Schultze, in common with all the earlier observers, did not overlook these structures. The only other important distinction is the little spine on anterior edge of the plates of the first pair. I have not seen such a spine in any species. Schultze figures a separate anal plate, a character possessed by many of Richters' species, but I have seen no species having such a plate. Little importance can, I think, be attached to this character, unless the animal observed is full-grown and mature.

Nether Habbie's Howe, Pentland Hills.

Echiniscus sp.?—Length $\frac{1}{100}$ inch, plates 9, granules moderate, lateral setæ 4, on head, first and second paired and lumbar plates, longest setæ on plates of first pair; dorsal processes, a weak spine on each plate of first pair; a small tooth on each plate of second pair; fringe of short spines on last leg, inner claws barbed.

From Moss, Fullarton, Midlothian, November 1905.

E. spitzbergensis, Scourfield.—The form of *Echiniscus* referred to this species in the previous paper differs from the type in having the dorsal process on each plate of the second pair elongate. The pattern on the plates, also, appears to consist of flat discs with depressed or perforate centre, instead of coarse granules. In both respects it closely resembles a species found in Franz Josef Land. Further study is necessary to determine whether that is distinct from *E. spitzbergensis*.

Genus MACROBIOTUS.

M. hufelandi, C. Sch.—Malleney Dam, Fullarton; form *simplex*, near Doune and Ochils above Dollar.

M. intermedius, Plate ?—A species agreeing with this as to pharynx and claws has been found at Duddingston, Upper Elf Loch, and Pentland Hills, but without finding the characteristic egg I would not be certain of the identification.

M. echinogenitus, Richters.—Upper Elf Loch on Braid Hills, 4th November, adult and typical egg. Three varieties of eggs, doubtfully referable to this extremely variable form, have also been found; 1st var., spines very long, straight, sharp, length about equal to half the diameter of the body of the egg, Elf Loch; 2nd var., spines very small cones, closely set, but not meeting at bases, Malleney Dam, near Balerno; 3rd var., spines

small cones standing far apart, about 17 in the circumference, Gullane Links.

M. ornatus, Richters?—A form agreeing with this species as to pharynx and claws, but with the skin perfectly glabrous and without spines, occurred at Fullarton, Winchburgh, and Thornton. This variety is connected with the type by Richters' var. *verrucosus*.

M. macronyx, Doy.—Upper Elf Loch, Largo, and Marl Pit at Davidson's Mains. The furca of the tooth is very large.

M. macronyx, var. ? (Figs. 2a to 2d).—Near Roslin, in March, Mr. Evans found an animal which would technically be called a *Diphascion*, but which has claws exactly like those of *M. macronyx*. It is a *simplex* form, having teeth without furca or bearers, and an elongate flexible gullet. As such forms are useful to indicate the affinities of the genera and species, it is here figured. The pharynx has rods sufficiently like those of *M. macronyx*, but is rounder.

Genus DIPHASCON

D. angustatum, Murray.—In damp moss, Thornton, Fife, December 1905. A *simplex* form, the first seen for this species. The gullet is a good deal longer and narrower than in the type.

D. oculatum, n.sp. (Figs. 1a to 1c.) *Specific characters*.—Large, narrow, broadest in middle. Two dark eye-spots. Teeth curved, with bearers; gullet very long, slender; pharynx nearly round; thickenings two short oval bodies and at posterior end a little round nut (what Richters calls a "komma"). Claws, a short thick pair, and a pair with one very long claw apparently springing from the middle of the back of the shorter claw, long claw with a fine spine near the apex.

It is the first species of the genus found possessed of eyes, and is named from that peculiarity, although the character is somewhat unstable in the genus *Macrobiotus*. If we suppose it without eyes or flexible gullet (both somewhat untrustworthy characters) it would still be distinguishable from any species of *Macrobiotus* having similar pharynx, by the structure of the claws. The lower portion of the long claw seems to be less firm than the upper part. This is indicated (Fig. 1c) by shading the firmer portion. There is a little thickening at the end of the gullet in the pharynx in addition to those enumerated in the description. Six eggs, in a very early stage of development, are seen in the body. Total length 347μ , pharynx $33\mu \times 26\mu$; long claw (from base of pair) 21μ .

Hopetoun Woods, Linlithgowshire, 2nd December 1905 (W. Evans).

D. chilense, Plate.—In the previous paper on Forth Tardigrada, and in several other papers, I have in error spelt the name *chilense*, though I now find that Dr. Plate spelt it *chilenense*.

D. scoticum, Murray.—In the key to the genus *Diphascon*, given in the previous paper, there is a mistake made in distinguishing this species from *D. spitzbergense*, Richters, by the thickenings in the pharynx. Dr. Richters has since sent me specimens of *D. spitzbergense*, and I find that the rods of the pharynx are alike in the two species. *D. scoticum* is distinguished by the much more slender gullet, oval pharynx, and lenticular bodies in the cells of the stomach. The mistake arose through Dr. Richters identifying a Scottish species, not yet described, as *D. spitzbergense*.

Additional localities: Winchburgh, Thornton, Davidson's Mains, and Bavelaw.

These additions bring the list of Tardigrada known to occur in the Forth area up to 18, but two of these are not yet named. The complete list of the species identified is here appended:—

<i>Echiniscus arctomys</i> , Ehr.	<i>M. ornatus</i> , Richters.
<i>E. mutabilis</i> , Murray.	<i>M. macronyx</i> , Doy.
<i>E. wendti</i> , Richters.	<i>Milnesium tardigradum</i> , Doy.
<i>E. granulatus</i> , Doy.	<i>Diphascon chilense</i> , Plate.
<i>E. spitzbergensis</i> , Scourfield.	<i>D. scoticum</i> , Murray.
<i>Macrobiotus hufelandi</i> , Schultze.	<i>D. bullatum</i> , Murray.
<i>M. intermedius</i> , Plate ?.	<i>D. angustatum</i> , Murray.
<i>M. echinogenitus</i> , Richters.	<i>D. oculatum</i> , n.sp.

EDINBURGH.

ON THE NOMENCLATURE OF BRITISH PLANTS AS AFFECTED BY THE LAW ADOPTED BY THE BOTANICAL CONGRESS AT VIENNA.

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THE rule which was passed by a majority of botanists attending the Vienna Congress in 1905, which insists on the earliest specific name being retained in the valid name, except in such instances where the original specific name is now employed in a generic sense, or where the specific name has already been used to designate a plant in the same genus, leads if adopted to a considerable change in

the names of our British plants. The following paper, which is suggestive rather than authoritative, attempts to give some of the principal instances. It may have the advantage of directing attention to the subject, and will allow the suggested names to be subjected to criticism. In many cases, such as *Cladium Mariscus*, *Lloydia serotina*, the names are already familiar. It appears to me unfortunate that the adopted rule should not have been made absolute, allowing no exceptions, and that it should not also be applied to the varieties. To have one rule for genera, another for species, and another for varieties, does not appear to be likely to lead to a final settlement of this most vexed question.

In the paper the following changes are owing to the application of the standing law of priority, and are not necessarily the outcome of the Vienna Congress:—*Adonis annua*, *Ranunculus fœniculaceus*, *Dipsacus fullonum*, *Oxycoccus quadripetala*, *Nymphoides orbiculata*, *Cuscuta vulgaris*, *Lycium chinense*, *Mimulus Langsdorfii*, *Veronica Buxbaumii*, *Galopsis dubia*, *G. speciosa*, *Mentha verticillata*, *M. spicata*, *M. aquatica*, *Fagopyrum sagittatum*, *Sparganium erectum*, *Damasonium Alisma*, *Anthoxanthum aristatum*, *Alopecurus æqualis*, *Agrostis tenuis*, *Poa cæsia*, *Bromus hordeaceus*, *B. rigens*, and *Hordeum bulbosum*.

Adonis annua, L., "Sp. Plant." 1753: vice *A. autumnalis*, L., "Sp. Pl.," 1762. See Britton and Brown's "Illustrated Flora of the Northern States," and Druce's "Flora of Berkshire."

Ranunculus fœniculaceus, Gilib., "Fl. Lituan.," v. 264, 1782: vice *R. circinatus*, Sibth., "Fl. Oxon.," 175, 1794. The former name is adopted by Rouy and Foucaud in "Flore France," and by Durand in "Flore Belgique."

Glaucium corniculatum, Curtis, "Fl. Lond.," vi. 32: instead of *G. phæniceum*, Crantz, "Stirp. Austr.," i. 133. It was the *Chelidonium corniculatum*, L., "Sp. Pl.," 1753. *G. corniculatum* is adopted in "Index Kewensis," but under *Chelidonium phæniceum* it is referred by a slip to *G. phæniceum*.

Rœmeria hybrida, DC., "Syst.," ii. 93, should be retained; it was the *Chelidonium hybridum*, L., 1753. In the "Index Kewensis" and the last edition of Babington's "Manual" the earlier *R. violacea*, Medic., in Usteri, "Ann. Bott.," iii. 15, 1792, is chosen.

- Capnoides solida, Moench, "Meth.," 52 (*Neckeria solida*): vice *Neckeria bulbosa*, N. E. Br., "Suppl. E. B." ed. 3 = *Fumaria bulbosa*, var. *c. solida*, L., 1753 = *F. solida*, Mill, "Gard. Dict.," 1768.
- Barbarea lyrata, Aschers., "Fl. Prov. Brandb.," i. 35: vice *B. vulgaris*, R. Br., in Aiton's "Hort. Kew.," ed. 2, iv. 109 = *Erysimum lyratum*, Gilib., "Fl. Lituan.," ii. 59, 1782. It is the *Erysimum Barbarea*, L., 1753. With var. *divaricata*.
- B. verna*, Aschers, *l.c.*: vice *B. præcox*, R. Br., *l.c.* It is the *Erysimum vernum*, Mill, "Gard. Dict.," ed. 8, No. 3, 1768.
- Arabis glabra*, Bernh., "Syst. Verz. Erf.," 195: vice *A. perfoliata*, Lam., "Enc.," i. 219, and "Index Kewensis" = *Turritia glabra*, L., 1753.
- Erophila verna*, E. Meyer, ex Garcke, "Fl. Deutsch.," ed. 4, 35: vice *E. vulgaris*, DC., "Syst.," ii. 356, and "Ind. Kewensis" = *Draba verna*, L., 1753.
- Conringia orientalis*, Dumort., "Fl. Belg.," 123, and "Index Kew.": vice *C. perfoliata*, Link, "Enum. Hort. Berol.," ii. 172. It is the *Brassica orientalis*, L., 1753. If retained in the genus *Erysimum* it must stand as *E. orientale*, Miller, "Gard. Dict.," ed. 8, 1768, not as *Erysimum perfoliatum*, Crantz, as in the "London Catalogue."
- Brassica nigra*, Koehl., in Rohl., "Deutsch. Fl.," ed. 3, iv. 13: vice *B. sinapioides*, "Roth. Man.," ii. 95, and "Index Kew. Suppl." It is *Sinapis nigra*, L., 1753.
- B. arvensis*, Kuntze, in "Act. Hort. Petrop.," x. 164, 1887 (not of the Linnean *Mantissa*, which is *Moricandia arvensis*, nor of Hahl. *Taur.*, which is *B. campestris*), replaces *B. sinapistrum*, Boiss., "Voy. Espagne," ii. 39 = *Sinapis arvensis*, L., 1753. With var. *orientalis* (Asch.).
- Coronopus procumbens*, Gilib., "Fl. Lituan.," ii. 52, 1782: vice *C. Ruellii*, All., "Fl. Ped.," i. 256, 1789.

In the ninth edition of Babington's "Manual," the genus *Radicula*, Hill (*Dillenius*), replaces *Nasturtium*, R. Br., and *Roripa*, Scop.; but to comply with the Vienna rule the name should be as follows:—

- Radicula nasturtium* (L., 1753, under *Sisymbrium*): vice *R. officinale*, Groves, with var. *siifolia* (Reichb.), and var. *microphylla* (Reichb.).
- R. sylvestris* (L., 1753, as *Sisymbrium*): vice *R. pinnata*, Moench, "Meth.," 262, 1794.

- R. amphibia* (L., 1753, as *Sisymbrium*): vice *R. lancifolia*, Moench, *l.c.*, with var. *indivisa* (DC.), and var. *variaefolia* (DC.). The latter species is put in the "Manual" as *Armoracia amphibia*.
- Silene venosa*, *Aschers*, "Fl. Brand," i. 86: vice *S. Cucubalus*, Wibel, "Prim. Fl. Werth.," 241, and "Ind. Kew." = *S. inflata*, Sm. It is the *Cucubalus Behen*, L., 1753 (but there is a valid *Silene Behen*, L.), and the *Cucubalus venosus*, Gilib., "Fl. Lituan.," ii. 165, 1782, with var. *puberula* (Jord.).
- Cerastium erectum*, *Coss.* and *Germ.*, "Fl. Paris," 39, 1845: vice *C. quaternellum*, Fenzl, "Verbreit. Alsin.," t. ad. p. 56, and "Index Kew." It is the *Sagina erecta*, L., 1753.
- C. cerastoides*, *Britton*, in "Mem. Torrey Bot. Club," t. 150, 1894: replaces *C. trigynum*, Vill., "Prosp.," 48, and of "Ind. Kew.,"; and *C. lapponicum*, Crantz, "Inst.," ii. 402, and of "Bab. Man.," ed. 9.
- Arenaria rubella*, Sm., "E. B. Suppl.," t. 2538, 1831: vice *A. sulcata*, Schlecht., in "Ges. Naturf. Fr. Berl. Mag.," vii. 212, 1813. It is the *Alsine rubella*, Wahl., "Fl. Lapp.," 128, 1812, and *Minuartia rubella*, Hiern, and "Bab. Man.," ed. 9 (*Arenaria rubella*, Sm., is erroneously stated in "Index Kewensis" to be *A. verna*.).
- A. tenuifolia*, L., in Babington's "Manual," ed. 9, Messrs. Groves name this *Minuartia leptophylla*; but if the genus *Minuartia* be adopted it should stand as *M. tenuifolia* (L.), not of Nees ex Mart., "Hort. Erlang.," 44, which is *A. mucronata*.
- Sagina saginoides* (L.), Dalla Torre, "Anleit. Beob. Alpenfl.," 189, 1882: vice *S. Linnaei*, Presl., "Fl. Sicil.," 158, and "Index Kew." = *Spergula saginoides*, L., 1753.
- S. laricina* (*Lightf.*). In the "Flora Scotica," 244, 1777, Lightfoot describes the plant commonly known as *S. subulata*, Presl., "Fl. Sicil.," 158. (In the "Ind. Kew." a *S. subulata*, Wimm. "Fl. Schles.," 76, 1841, is also given in Roman letters), using for it the Linnean name *Spergula laricina*, which, however, is a different species, a Siberian plant not known as British, and the Linnean name is still valid for it as a *Spergula*, it is therefore a question whether Lightfoot's trivial name is to be adopted under *Sagina*. Lightfoot saw its relationship with *Sagina procumbens*.
- Alsine*, L. Mr. Hiern, in a paper in the "Journ. Bot.," 317 (1899), suggested that the genus named *Spergularia* in the "Index Kew.," *Lepigonum* in "Bab. Manual," ed. 8, and *Buda* in the "Lond. Catalogue," should be put under *Alsine*, L. (Why should they not be put under *Tissa*, Adans?) Following Hiern the names should be:—

Alsine rupestris (Kindb.): vice *A. rupicola*, Hiern, *l.c.*, *Lepigonum rupestre*, Kindb., "Symb. Syn. Lepigon.," 8, 1856, and *Spergularia rupicola*, Lebel, in "Mém. Soc. Sc. Nat. Cherb.," vii. 274, 1860, and var. *glabrescens*.

Alsine media (L., 1753 as *Arenaria*) (not of *Linnaeus*, which is *Stellaria media*): vice *A. marina*, Wahl. = *Spergularia marginata* (DC., under *Arenaria*), Kittel = *Buda media*, Dumort., with var. *glandulosa* (Druce).

Alsine marina (Pall.), Mert. and Koch, in "Roehl. Deutsch. Fl.," ed. 3, ii. 293, 1826, exc. var. *b.*: vice *A. salina*, Groves, *l.c.* = *Arenaria rubra*, var. *marina*, L., 1753, *Arenaria marina*, Pall., "Reise," iii. 603, 1776, and Roth., "Tent. Fl. Germ.," i. 189, 1788 = *Lepigonum medium*, Wahl. = *Buda marina*, Dumort., "Fl. Belg.," 110, 1827, with var. *media* (Fries), and var. *neglecta* (Kindb.).

The references in "Index Kewensis" under *Buda* appear to be incorrect. *Buda marina* and *B. media*, Dum., are both referred to *Spergularia marina*; but under *Spergularia S. media* only is put in Roman letters, *S. salina*, Presl., is put in same type as the others.

Trigonella ornithopodioides, DC., "Fl. Fr.," iv. 550, and "Index Kew.": vice *T. purpurascens*, Lam., "Fl. Fr.," ii. 590 = *Trifolium M. ornithopodioides*, L., 1753.

Vicia tetrasperma, Moench, "Meth.," 148: vice *V. gemella*, Crantz, "Stirp. Austr.," ed. 2, fasc. v. 389 = *Ervum tetraspermum*, L., 1753, with var. *tenuifolium*, Fries.

Potentilla sterilis, Garcke, "Fl. Deutschl.," ed. 5, 112: vice = *P. Fragariastrum*, Ehrh. ex Hall, f., in "Ser. Mus. Helv.," i. 49, 1818, and "Index Kew.," *Fragaria sterilis*, L., 1753.

Pyrus hybrida (L.) Sm., "Fl. Brit.," ii. 534, not of Willdenow: vice *P. pinnatifida*, Ehrh. "Plantag.," p. 22, and "Ind. Kew." = *Sorbus hybrida*, L., 1753.

Ludwigia palustris, Elliot, "Sketch," i. 211, and "Ind. Kew.": vice *L. apetala*, Walt. "Fl. Carolin.," 89 = *Isnardia palustris*, L., 1753.

Anthriscus chærophyllea (Lam.): vice *A. vulgaris*, Bernh., "Syst." 168, 1800 = *Myrrhis chærophyllea*, Lam. "Fl. Fr.," iii. 178 = *Scandix Anthriscus*, L., 1732. In the "Flora of Berkshire" I put the above plant in the genus *Cerfolium*, Link, in Usteri, "Delect. Opus.," ii. 114, 1793, as *C. Anthriscus*, Beck.; and this appears to be the oldest generic name.

Apinella glauca, Caruel: vice *Trinia glaberrima*, Hoffm. "Gen. Umb.," ed. 1, 93, and *T. vulgaris*, DC., "Prod.," iv. 103, and

"Index Kew." = *Pimpinella glauca*, L., 1753 = *Trinia glauca*, Reichb., "Pl. Crit.," 25.

Physospermum cornubiense, DC. "Prod.," iv. 246: vice *P. aquilegifolium*, Koch, and *P. commutatum*, Spreng., "Sp. Umbell. Prod.," 19, and "Index Kew." = *Ligusticum cornubiense*, "Amœn. Acad.," iv. 310.

Conopodium majus (Gouan): vice *C. denudatum*, Koch, in "Nov. Ant. Nat. Cur.," xi. 119, 1824 = *Bunium majus*, Gouan, "Illustr.," 10, 1773 (not of Bieberstein), and *B. flexuosum*, Stokes, in With., "Nat. Arr.," ed. 2, 276, 1786. It is the *Bunium Bulbocastanum*, Hudson, but not of Linnæus.

Cœnanthe aquatica, Poir., in "Lam. Encyc.," iv. 530: vice *O. Phellandrium*, "Lam. Fl. Fr.," ii. 432 = *Phellandrium aquaticum*, L., 1753.

Dipsacus fullonum, L., 1753: vice *D. sylvestris*, Huds., "Fl. Angl.," 1762.

Valerianella Auricula, DC., "Fl. Fr.," Suppl. 492: vice *V. rimosa*, Bast., in "Desv. Journ. Bot.," iii. 20 (1814) = *Fedia Auricula*, Mert. and Koch, "Deutschl. Fl.," i. 400.

Diotis maritima, Hook., "Fl. Lond.," t. 137: vice *D. candidissima*, Desf., "Fl. Atlant.," ii. 260, 1798, and "Index Kew." = *Athanasia maritima*, L., "Sp. Pl.," ed. 2, 1762 = *Filago maritima*, L., 1753, teste Smith.

Senecio integrifolia, Clairv., "Man. Herb.," 241, 1811: vice *S. campestris*, DC., "Prod.," vi. 361, and "Index Kew." = *Othonna integrifolia*, L., 1753. In "Index Kew.," *S. integrifolia*, Clairv., is referred to *S. spathulæfolius*, but Mr. F. N. Williams, in "Prod. Fl. Brit.," pars. ii. 39, considers it as synonymous with *S. campestris*.

Pulicaria prostrata (Gilib.), Aschers., "Fl. Brand.," 304: vice *P. vulgaris*, Gaertn., "Fruct.," ii. 461, 1791 = *Inula prostrata*, Gilib., "Fl. Lituan.," i. 205.

Cnicus britannicus (Scop.): vice *C. pratensis*, Willd., "Sp. Pl.," iii. 1672, and "Index Kew.," *Cirsium britannicum*, Scop., 'Iter Gorizense,' in "Ann. Hist. Nat.," ii. 60, 1769; but not of the pre-Linnean *Chusius*, Pann., 657.

Arctium vulgare (Hill): vice *A. majus*, Bernh., "Syst. Verz.," Erf., 154 = *Lappa vulgaris*, Hill, "Syst.," e.g. iv. 28, 1762. The aggregate species is *A. Lappa*, L., 1753.

Arnoseris minima, Dum., "Fl. Belg.," 63: vice *A. pusilla*, Gaertn., "Fruct.," ii. 355, and "Index Kew.," = *Hyoseris minima*, L., 1753.

- Crepis mollis*, *Aschers.*, "Fl. Brand.," 385; vice *C. succisæfolia*, Tausch, in "Flora," ix. i., 1828, and "Index Kew." = *Hieracium molle*, Jacq., "Fl. Austr." ii. 12, 1774.
- Calluna vulgaris*, *Salisb.*, in "Trans. Linn. Soc.," vi. 317, 1802, Hull, "Brit. Fl.," and "Index Kew.": vice *C. Erica*, DC., "Fl. Fr.," i. 680 = *Erica vulgaris*, L., 1753.
- Moneses uniflora*, *A. Gray*, "Man.," 273, 1848: vice *Moneses grandiflora*, S. F. Gray, "Nat. Arr.," ii. 403 = *Pylora uniflora*, L., 1753.
- Boretta cantabrica*, *O. Kuntze* = *Dabeocia cantabrica* (Huds.): vice *D. polifolia*, Donn., in "Index Kew." = *Vaccinium cantabricum*, Huds., "Fl. Angl.," 1762.
- Bryanthus cœruleus* (L.), Dippel, "Handb. Laubh.," i. 325, 1889: vice *B. taxifolius*, A. Gray, in "Proc. Amer. Acad.," vii. 368, 1868 = *Andromeda cœrulea*, L., 1753.
- Oxycoccus quadripetala*, *Gilib.*, "Fl. Lituan.," i. 5: vice *Schollera oxycoccus*, Roth., "Tent. Fl. Germ.," i. 170, and *O. palustris*, Pers., "Syn.," 419, as in "Index Kew."
- Limnanthemum Nymphoides*, *Hoffmg.* and *Link.* "Fl. Port.," i. 344: vice *L. peltatum*, Gmel., in "Nov. Comm. Act. Petrop.," xiv. 527, 1769. Both *L. Nymphoides* and *L. peltatum* are printed in Roman letters in "Index Kew." The oldest generic name appears to be *Nymphoides*, Hill, "Brit. Herb.," 1756; and the name to be used, if that generic name be chosen, is *N. orbiculata*, Gilib., "Fl. Lituan.," i. 33. It is *Menyanthes nymphoides*, L., 1753.
- Cuscuta vulgaris*, *J.* and *C. Presl*, "Fl. Cech.," 56, 1819: vice *C. epilinum*, Weihe, "Arch. Apothek.," viii. p. 54, 1824.
- Lycium chinense*, *Mill.*, "Gard. Dict.," ed. 8, n. 5: vice *L. barbarum*, L., 1753.
- Linaria minor*, *Desf.*, "Fl. Atl.," ii. 46: vice *L. viscida*, Moench, "Meth.," 524, and "Index Kew." = *Antirrhinum minus*, L., 1753.
- Mimulus Langsdorfii*, *Donn.*: vice *M. luteus*, L., 1753.
- Veronica buxbaumii*, *Ten.*, "Fl. Nap.," i. 7: vice *V. Tournefortii*, C. C. Gmel., "Fl. Baden.," i. 39, and "Index Kew." See Williams in "Journ. Bot."
- Nepeta hederacea* (L.), Trev. "Prosp. Fl. Eug.," 26: vice *N. glechoma*, Benth., "Lab. Gen. et Sp.," 736, and "Index Kew." = *Glechoma hederacea*, L., 1753.
- Stachys officinalis* (L.) Franch., "Fl. Loire-et-Cher," 483: vice *S. Betonica*, Benth., *l.c.*, p. 532, and of "Index Kew.," not of Crantz or Scopoli = *Betonica officinalis*, L., 1753.

- Calamintha acinos*, *Clairv.*, "Man Herb.," 197, and *Index Kew.* : vice *C. arvensis*, Lam., "Fl. Fr.," ii. 394 = *Thymus acinos*, L., 1753.
- C. grandiflora*, *Moench*, "Meth.," 408, 1794 : vice *C. sylvatica*, Bromf., in "E. B." Suppl., t. 2897 = *Melissa grandiflora*, L., 1753.
- C. Montana*, *Lam.*, "Fl. Fr.," ii. 396, 1778 [and of Dodoens' "Pemptades," 98] : vice *C. officinalis*, Moench, "Meth.," 409, 1794 = *Melissa calamintha*, L., 1753, with var. *Briggsii*, Druce, "Fl. Berks."
- C. vulgaris* (L.), not of Clairv., which is *C. Nepeta* : vice *C. Clinopodium*, Benth., in DC., "Prod.," xii. 233 = *Clinopodium vulgare*, L., 1753.

In Durand's "Prod. Fl. Belg." these are put in the genus *Satureja*, as *S. acinos*, Scheele, *S. calamintha*, Scheele, and *S. clinopodium*, Caruel.

- Calamintha Nepeta*, *Savi*, "Fl. Pisa," 197, 1798, and "Index Kew." : vice *C. parviflora*, Lam., "Fl. Fr.," ii. 396 = *Melissa Nepeta*, L., 1753.

Messrs. Groves, in the ninth edition of Babington's "Manual," following Kuntze in "Rev. Gen. Pl.," put these Calamints into the genus *Clinopodium* (all being of O. Kuntze), except *Clinopodium vulgare*, L., 1753.

- Galeopsis dubia*, *Leers*, "Fl. Herb.," 133, 1775 : vice *G. ochroleuca*, Lam., "Ency.," ii. 600, 1780, and "Index Kew."
- G. speciosa*, *Mill.*, "Gard. Dict.," ed. 8, 1768 : vice *G. versicolor*, Curtis, "Fl. Lond." vi. 38, and "Index Kew."
- Mentha verticillata*, *Huds.*, "Fl. Angl.," 222, 1762 (not of "Linn. Syst.," 1759, which is *M. arvensis*) : vice *M. sativa*, L., 1763, with vars. *rivalis*, *paludosa*, *subglabra*.
- M. spicata*, *Huds.*, "Fl. Angl.," 1762 : vice *M. viridis*, L., 1763 = *M. spicata*, var. *viridis*, L., 1753, and var. *crispa*.
- M. aquatica*, L., 1753 : vice *M. hirsuta*, *Huds.*, "Fl. Angl.," 1762, with vars. *subglabra*, *citrata*, *affinis* (Bor.), etc.
- Littorella uniflora*, *Asch.*, "Fl. Brandb.," 544 : vice *L. juncea*, Bergh., in "Vet. Acad. Handl. Stockh.," xxxix. 341, 1768, and of "Index Kew." = *Plantago uniflora*, L., 1753.

Suæda maritima and *S. fruticosa*. In the "Manual" Messrs. Groves, following Kuntze, use the generic name *Lerchea*, Hall., misspelled 'Lerchia' in the "Manual," and the species stand as *L. maritima*, O. Kuntze, and *L. obtusifolia*, "Steud." If that genus be adopted the latter species should be *Lerchea fruticosa*,

as it is the *Chenopodium fruticosum*, L., 1753. The question, however, arises as to the validity of the generic name. The genus *Lerchea* was founded by Haller in "Hort. Gotting.," in 1743, and the name is used in the edition of that work dated 1753, which was probably printed before the "Species Plantarum" of that year, and if so was ante-binomial. It also has the disadvantage of differing by a single letter only from *Lechea*, L., 1753. As I have already observed in these pages, *Dondia* of Adanson appears to be the preferable name for this genus; and it has been adopted by Britton and Brown in the "Illustrated Flora of the Northern States and Canada." The species stand as *Dondia maritima* and var. *procumbens* (Syme), and *D. fruticosa*, Druce, in "Ann. Scot. Nat. Hist.," 1905, p. 42.

Polygonum sagittatum, Gilib., "Exercit.," ii. 435; precedes *P. esculentum*, Moench, "Meth.," 290, and of "Index Kew."
= *Polygonum fagopyrum*, L., 1753.

Cephalanthera damasonium (Mill.): vice *Cephalanthera alba*, Simonk., "En. Pl. Trans.," 1887 = *C. grandiflora*, S. F. Gray, "Nat. Arr.," ii. 210 (*Serapias grandiflora*, L., "Mant.," 1771) = *C. pallens*, Rich., "Mém. Mus. Par.," iv. 60, 1818, and of "Index Kew." = *Serapias Damasonium*, Miller, "Gard. Dict.," ed. 8, No. 2, 1768, based on "*Damasonium alpinum*, sive Elleborine, floribus albis," of J. Bauhin, "Hist.," iii. 2, 516.

C. longifolia, Fritsch, in "Æ. Bot. Zeit.," xxxviii. 81, 1888: vice *C. ensifolia*, Rich., l.c. = *Serapias Helleborine*, var. *B. longifolia*, L., 1753 = *S. longifolia*, Scop., "Fl. Carn.," ii. 202, 1772.

Habenaria montana (Schmidt, "Fl. Boem.," i. 35, t. 56, as *Orchis*, teste Richter, not of R. Brown): vice *H. chloroleuca*, Ridl., in "Journ. Bot.," xxiii. 219, 1885. In the "Index Kew.," *Orchis montana*, Schmidt, is given as synonymous with *Habenaria nigra*; but I am able to find no corroboration of this reference in other authors, and Durand in "Prod. Fl. Belg.," p. 185, uses *Platanthera montana*, Richb., "Ic. Fl. Germ.," xiii. 123, 1851, which is based upon *Orchis montana*, Schmidt.

Spiranthes spiralis, C. Koch, in "Linnæa," xiii. 290, 1839: vice *S. autumnalis*, Rich., in "Mém. Mus. Par.," iv. 59, 1818 = *Orchis spiralis*, L., 1753 = *Gyrostachys spiralis*, Druce, "Fl. Berks.," 468.

Corallorhiza Neottia, Scop., "Fl. Carn.," ed. 2, ii. 207, 1772: vice *C. innata*, R. Br., in Aiton's "Hort. Kew.," ed. 2, v. 209, and "Index Kew." = *Ophrys corallorhiza*, L., 1753.

- Polygonatum odoratum* (*Mil.*): vice *P. officinale*, All., "Fl. Pedom.," i. 131, and "Index Kew." = *Convallaria odorata*, Miller, "Gard. Dict.," ed. 8, No. 3, 1768, "Sweet Smelling Solomon's Seal."
- Scilla nonscripta*, *Link* and *Hoffmg.*, in "Ges. Naturf. Fr. Neue Schrift.," iv. 19, 1803: vice *S. festalis*, Salisb. "Prod.," 242, and "Index Kew." = *Hyacinthus nonscriptus*, L., 1753.
- Gagea lutea*, *Ker-Gawl.*, in "Bot. Mag.," t. 1200: vice *G. fascicularis*, Salisb., in Kon. and Sims. "Ann. Bot.," ii. 555, 1806 = *Ornithogalum luteum*, L., 1753, teste "Index Kew."
- Lloydia serotina*, *Sweet*, "Hort. Brit.," ed. 2, 527: vice *L. alpina*, Salisb., in "Trans. Hort. Soc.," i. 328, 1812 = *Anthericum serotinum*, L., 1753.
- Simethis planifolia*, *Gren.* and *Godr.*, "Fl. Fr.," iii. 222: vice *S. bicolor*, Kunth., "Enum. Pl.," iv. 618 = *Anthericum planifolium*, Vand., in "L. Mant.," ii. 224, 1771. *Pubilaria*, *Raf.*, is the older generic name, and the plant should be called *Pubilaria planifolia* (*Vand.*) rather than *P. bicolor*, *Raf.*
- Maianthemum bifolium*, *Redoute*, "Lil.," t. 216, 1805: vice *M. Convallaria*, [Weber in] Wigg., "Prim. Fl. Hols.," 15, and "Index Kew." = *Convallaria bifolia*, L., 1753. The older generic name is *Unifolium*, *Haller*, ex *Fabr.*, "Enum. Hort. Helmst.," 1759, and the name in that genus is *U. bifolium*, *Druce*, "Fl. Berks.," 489. *Britton* and *Brown* use this generic name in the "Illust. Flora of the Northern States."
- Sparganium erectum*, L., 1753: vice *S. ramosum*, *Huds.*, "Fl. Angl.," 1762, and var. *microcarpum* (*Neum.*).
- Naias alagnensis*, *Pollini*, "Fl. Veronese," iii. 49: vice *N. graminea*, *Delile*, "Fl. Egypt.," 282 = *Caulinia alagnensis*, *Poll.*, "H. and Prov. eron. Pl. Nov.," i. 26, 1816.
- Wolffia arrhiza*, *Wimm.*, "Fl. Schles.," 140: vice *W. Michelii*, *Schleid.*, "Beitr. Bot.," 233, and "Index Kew." = *Lemna arrhiza*, L., 1753 = *Horkelia arrhiza*, *Druce*, "Fl. Berks.," 511.
- Damasonium alisma*, *Mill.*, "Gard. Dict.," ed. 8, 1768: vice *D. stellatum*, *Thuill.*, "Fl. Par.," ed. 2, 186, and "Index Kew." = *Alisma Damasonium*, L., 1753.
- Luzula pilosa*, *Willd.*, "Enum. Hort. Berol.," 393, 1809: vice *L. vernalis*, DC., "Fl. Fr.," iii. 160, 1805 = *Juncus pilosus*, L., 1753.

- L. sylvaticum*, *Gaud.*, "Agr. Helv.," ii. 240, 1811: vice *L. maxima*, DC., *l.c.* = *Juncus sylvaticus*, Huds., "Fl. Angl.," 132, 1762, and var. *gracilis* (Rostr.).
- L. multiflora*, *A. L. S. Lejeune*, "Fl. Spa.," 169, 1811: vice *L. erecta*, Desv., "Journ. Bot.," i. 156, 1808 = *Juncus multiflorus*, Ehrh., "Cal.," ex Hoffm. "Deutsch. Fl.," i. 169, 1791, with vars. *umbellata*, *congesta*, *sudetica*, and *pallescens*. Messrs. H. and J. Groves, in "Babington's Manual," following Kuntze, adopt the generic name *Juncoides*, but they spell it as Adanson did, not *Juncodes*, as Kuntze does in the "Rev. Gen. Pl."
- Eriocaulon articulatum*, *Morong.*, in "Bull. Torr. Club.," 18, 353, 1891: vice *E. septangulare*, With., "Nat. Arr. Br. Pl.," ed. 3, ii. 184, 1796 = *Nasmythia articulata*, Huds., "Fl. Anal.," 415, 1778.
- Cladium mariscus*, *R. Br.*, "Prod.," 236: vice *C. jamaicense*, Crantz, "Inst.," i. 362 = *Schœnus Mariscus*, L., 1753. The "Index Kew." still uses *C. germanicum*, Schrad.
- Kobresia bipartita*, *Dalla Torre*, "Anal. z. Best. d. Alpenpfl.," 330, 1882: vice *K. caricina*, Willd., "Sp. Pl.," iv. 206, 1805, and "Index Kew." = *Carex bipartita*, All., "Fl. Ped.," ii. 265, 1785.
- Eriophorum paniculatum*, *Lam.*: vice *E. latifolium*, Hoppe, Taschenb. = *Linagrostis paniculata*, Lam., "Fl. Fr.," iii. 555.
- Scirpus compressus*, *Pers.*, "Syn.," i. 66: vice *S. Caricis*, Retz, "Fl. Scan. Prod.," 11 = *Schœnus compressus*, L., 1753 = *Blysmus compressus*, Panz.
- Hierochloe odorata*, *Wahl.*, "Fl. Ups.," 32: vice *H. borealis*, Roem. and Schult., "Syst.," ii. 215, and "Index Kew." = *Holcus odoratus*, L., 1753.
- Phleum phleoides*, *Simk.*, "En. Pl. Trans.," 563, 1886: vice *P. phalaroides*, Koel., "Desat. Gram.," 52, and *P. Bochmeri*, Wibel., "Prim. Worth.," 125, and "Index Kew." = *Phalaris phleoides*, L., 1753.
- Anthoxanthum aristatum*, *Boiss.*, "Voy. Bot. Esp.," ii. 638, 1845, var. *Puelii*: vice *A. Puelii*, Lec. and Lam.
- Alopecurus æqualis*, *Sobol.*, "Fl. Petrop.," 16, 1799: vice *A. fulvus*, Sm., "E.B.," xxi. t. 1467, 1805, and *Bab.* "Man.," ed. 9.
- Mibora minima*, *Desv.*, "Fl. d'Anj.," 46, 1827: vice *M. verna*, Beauv., "Agrost.," 167, and "Index Kew." = *Agrostis minima*, L., 1753.

- Agrostis tenuis*, *Sibth.*, "Fl. Oxon.," 36, 1794: vice *A. vulgaris*, With., "Bot. Arr.," ed. 3, ii. 132, 1796, with vars. *nigra* (With.), and *pumila* (L.).
- Calamagrostis canescens* (*Wigg.*), vice *C. lanceolata*, Roth., "Tent. Fl. Germ.," i. 34; not of Stokes or Trinius, but of "Index Kew." = *Arundo canescens*, *Wigg.*, "Fl. Hols.," 10, 1780, *teste* Richter. It is the *Arundo Calamagrostis*, L., 1753.
- Ammophila Arenaria*, *Link.*, "Hort. Berol.," i. 105, 1827: vice *A. arundinacea*, Host., "Gram. Austr.," iv. 24, p. 41 = *Arundo Arenaria*, L., 1753.
- Gastridium lendigerum*, *Gaud.*, "Fl. Helv.," i. 176: vice *G. australe*, Beauv., "Agrost.," 21, 1812, and "Index Kew." = *Milium lendigerum*, L., 1753.
- Fibichia Dactylon*, L.: vice *F. umbellata*, Koel., "Gram. Gall. et Germ.," 308, 1802 = *Panicum Dactylon*, L., 1753. The "Index Kewensis" puts it as *Cynodon Dactylon*, Pers., i. 85, 1805, while Kuntze, in the "Rev. Gen. Pl.," calls it *Capriola Dactylon*, choosing Adanson's generic name, which has undoubted priority.
- Trisetum flavescens*, *Beauv.*, "Agrost.," 88: vice *T. pratense*, Pers., "Syn.," i. 97, and "Index Kew." = *Avena flavescens*, L., 1753.
- Deschampsia setacea*, *Richter*, "Pl. Europ.," i. 57, 1890: vice *D. discolor*, Roem. and Schult., "Syst.," ii. 686 = *Aira setacea*, Huds., "Fl. Angl.," 30, 1762; and this is the name adopted in error in "Index Kew.," instead of being put in the genus *Deschampsia*.
- Arrhenatherum elatius*, *Beauv.*, "Agrost.," 56: vice *A. avanaceum*, Beauv., "Agrost.," 55 = *Avena elatior*, L., 1753, with var. *biaristatum* (Peterm.).
- Molinia cœrulea*, *Moench*, "Meth.," 183, and "Index Kew.": vice *M. varia*, Schrank, "Baier. Fl.," i. 334 = *Aira cœrulea*, L., 1753, with vars. *depauperata* (Lindl.), *breviramosa*, *obtusa*, and *robusta*.
- Phragmites vulgaris*, *Trin.*, Fund., "Agrost.," 134: vice *P. communis*, Trin., *l.c.*, *Arundo vulgaris*, Lam., "Fl. Fr.," iii. 615, 1778 = *Arundo Phragmites*, L., 1753, with vars. *repens* and *nigricans*.
- Poa cæsia*, *Sm.*, "Fl. Brit.," i. 103, 1799: vice *P. glauca*, Sm., "Engl. Fl.," i. 128, 1824, not of Withering. Omitted from "Index Kewensis."

- Demazeria loliacea*, *Nym.*, "Syll.," 426 : vice *Festuca rotboelloides*, Kunth., "Gram.," i. 129 = *Poa loliacea*, Huds., "Fl. Angl.," 431, 1762 = *Catapodium loliaceum*, Link, "Hort. Berol.," i. 145, in Richter's "Pl. Europ." In "Index Kewensis" the adopted name is *Demazeria loliacea*, but the geographical distribution is incorrect.
- Festuca membranacea*, *L.* : vice *F. uniglumis*, Soland., in Ait. "Hort. Kew.," ed. 1. i. 108 = *Stipa membranacea*, *L.*, 1753, teste Richter. In "Ind. Kew." it is referred to *F. bromoides*, as is *F. uniglumis*.
- Bromus hordeaceus*, *L.*, 1753 : vice *B. mollis*, *L.*, 1763, with vars. *glabrescens* (Coss. and Germ.), *mycrostachys* (Duval Jouve), var. *Lloydianus* (Syme).
- Bromus rigens*, *L.*, "Mant.," i. 33 : vice *B. maximus*, Desf., "Fl. Atl.," i. 95.
- Brachypodium sylvaticum*, *Beauv.*, "Agrost.," 101, teste "Index Kew.," : vice *B. gracilis*, Beauv., "Agrost.," 101 = *Festuca sylvatica*, Huds., "Fl. Angl.," 35, 1762, and var. *glabrescens* (Syme).
- Elymus Europæus*, *L.*, 1753 : vice *Hordeum sylvaticum*, Huds., "Fl. Angl.," ed. 2, i. 57 ; or, if retained in the genus *Hordeum*, it will stand as *H. europæum*, All., "Fl. Ped.," ii. 60.
- Hordeum bulbosum*, *L.*, 1753 : vice *H. secalinum*, Schreb., "Spic. Fl. Lips.," 14, and "Index Kew."
- Woodsia alpina*, *S. F. Gray*, "Nat. Arr.," ii. 17, 1821 : vice *W. hyperborea*, R. Br., in "Linn. Trans.," xi. 173, t. 11, 1812 = *Acrostichum alpinum*, Bolton, "British Ferns," p. 76, 1790.
- Acrostichum hyperboreum*, *Liljeblad*, in "Act. Stockh.," p. 201, t. 8, 1793 = *Polypodium alpinum*, With., "Nat. Arr.," iii. 53, 1792. *Woodsia alpina* is adopted in the American "Check List," and in Ascherson and Graebner's "Fl. Mitt. Europ.," etc.
- Lastrea montana*, *Vogler* : vice *L. Oreopteris*, Presl., "Tent. Pterid.," 76 = *Polypodium montanum*, Vogler, "Diss. Odessæ," 1781, not of Lamarck.
- Phegopteris robertiana* (*Hoffm.*, "Deutsch. Fl.," ii. 20, 1795, as *Polypodium*) : vice *P. calcarea*, Fée, "Gen. Fil.," 243, 1850 = *Polypodium calcareum*, Smith, "Fl. Brit.," 1117, 1804.
- Cystopteris regia* (*L.*, 1753) as *Polypodium*, Desv., "Ann. Soc. Linn. Par.," vi. 264, 1827 : vice *C. alpina*, Desv., l.c. = *Polypodium alpinum*, Wulf., in Jacq. "Coll.," ii. 171, 1788.

ADDITIONS AND CORRECTIONS TO THE TOPOGRAPHICAL BOTANY OF SCOTLAND.

By JAMES W. H. TRAIL, A.M., M.D., F.R.S., F.L.S.

(Continued from p. 184.)

MONOCOTYLEDONS.

HYDROCHARIDACEÆ.

Elodea canadensis, Michx., 72, 73, 81, 94.

ORCHIDACEÆ.

Corallorhiza innata, *R. Br.*, 75 confirmed.

Neottia Nidus-avis, *Rich.*, 95.

Goodyera repens, *R. Br.*, 85.

Epipactis latifolia, *All.*, 74, 85, 99.

E. atrorubens, *Schultz.*, 94.

Orchis incarnata, *L.*, 85, 95, 100, 101, 107, 112.

O. maialis, 91, 92, 93, 94, 95, 101, 103, 105, 108, 110.

O. latifolia × *maculata*, 94.

O. maculata, *L.*, *subsp.* *ericetorum*, *E. F. Linton*, 103, 107, 108, 109, 111.

Ophrys apifera, *Huds.*, 77.

Habenaria albida × *Conopsea*, 108.

H. bifolia, *R. Br.*, 93, 101.

H. chloroleuca, *Ridley*, 96.

IRIDACEÆ.

Iris fœtidissima, *L.*, 82, 83, 85.

AMARYLLIDACEÆ.

Narcissus Pseudo-narcissus, *L.*, 94.

Galanthus nivalis, *L.*, 72, 83.

LILIACEÆ.

Ruscus aculeatus, *L.*, 100.

Asparagus officinalis, *L.*, 93.

Polygonatum multiflorum, *All.*, 73, 74, 85. A very doubtful native.

Maianthemum Convallaria, *Web.*, 84.

Convallaria maialis, *L.*, 84, Perthshire, 90.

Allium oleraceum, *L.*, 94.

A. paradoxum, *Don*, 83, 84.

A. carinatum, *L.*, 72.

- A. Schœnoprasum*, L., 96.
Scilla festalis, *Salish.*, native in 110.
Asphodelus fistulosus, L., casual in 83.
Muscari racemosum, Mill., casual in 83.
Ornithogalum umbellatum, L., 73.
Tulipa sylvestris, L., 90.
Gagea fascicularis, *Salish.*, 86.
Tofieldia palustris, *Huds.*, 106.

JUNCACEÆ.

- Juncus bufonius*, L., *var. fasciculatus*, *Koch.*, 106.
J. trifidus, L., 110.
J. compressus, *Jacq.*, 83.
J. tenuis, *Willd.*, 74, 89, 90 ?, 91, 98.
J. glaucus, *Leers*, 84, 109.
J. supinus, *Mœnch*, 79, 80; *var. Kochii*, *Bab.*, 111, 112; *var. fluitans*, *Fr.*, 74 confirmed, 96, 97, 108; *var. uliginosus*, *Roth.*, Perthshire, 92-94, 98, 105; *var. comosus*, *Breb.*, 93.
J. alpinus, *Vill.*, 101, 106.
J. castaneus, *Sm.*, 96.
J. triglumis, L., 105.
Luzula vernalis, *DC.*, 79.
L. maxima, *DC.*, 78. This is now on record from every vice-county in Scotland.
L. albida, *DC.*, 76, 83.
L. nivea, *DC.*, 85, 90.
L. arcuata, *Sw.*, 105.
L. spicata, *DC.*, 99.
L. campestris, *DC.*, 79.
L. erecta, *Desv.*, 93, 106, 108; both *congesta* and *umbellata* are common; *var. sudetica*, *Reichb.*, 92, 106.

TYPHACEÆ.

- Typha latifolia*, L., 94†, 101.
Sparganium ramosum, *Huds.* *Except* 107.
var. microcarpum, *Neum.*, 89, 95, 96, 98, 101.
S. affine, *Schnizl.*, 90.
S. minimum, *Fr.*, 81, 93, 94, 95.

ARACEÆ.

- Arum maculatum*, L., 79†, 93†.
Acorus calamus, L., 93†.

LEMNACEÆ.

- Lemna trisulca*, L., 99.

ALISMACEÆ.

Alisma ranunculoides, *L.*, *var. zosterifolium*, *Fr.*, 96.

Butomus umbellatus, *L.*, 93†.

NAIADACEÆ.

Potamogeton natans, *L.*, *var. prolixus*, *Koch.*, 89, 93.

P. polygonifolius, *Pour.*, *var. angustifolius*, *Fr.*, 88, 92, 98, 108.

var. pseudo-fluitans, *Syme*, 83.

P. coloratus, *Hornem.*, 98 confirmed, 103.

P. heterophyllus, *Schreb.*, 99.

P. nitens, *Web.*, 101, 103.

P. lucens, *L.*, 74, 76, 77.

P. angustifolius, *Presl.*, 72 ?, 84, 85, 104.

P. upsaliensis, *Fisch.* (= *angustifolius* × ? *perfoliatus*), 90.

P. prælongus, *Wulf.*, 79.

P. perfoliatus, *L.*, *var. lanceolatus*, *Blytt*, 80, (*not* 86).

P. crispus × *perfoliatus* (= *undulatus*, *Wolfgang*), 86.

P. crispus × *obtusifolius* (= *Bennettii*, *A. Fryer*), 86.

P. densus, *L.*, 72 ?, 73 ?.

P. zosteræfolius, *Schum.*, 75 ?.

P. obtusifolius, *Mert. and Koch.*, 76, 84, 93.

P. Friesii, *Rupr.*, 79 confirmed.

P. pusillus, *L.*, *var. tenuissimus*, *Koch.*, 72, 96.

P. pectinatus, *L.*, 99, 101, 108 ?.

P. interruptus, *Kit.*, 74.

P. filiformis, *Nolte*, 93, 95.

Ruppia spiralis, *Hartm.*, 73 ?.

R. rostellata, *Koch.*, 106 ; *var. nana*, *Boswell*, 101.

Zannichellia palustris, *L.*, *aggr.*, 72, 74, 85 ?, 90, 93, 97, 101, 103,
110, 112.

Zostera marina, *L.*, 108 ; *var. angustifolia*, *Hornem.*, 101, 106, 108,
110.

Z. nana, *Roth.*, 82, 85, 101.

CYPERACEÆ.

Eleocharis acicularis, *R. Br.*, 97.

E. uniglumis, *Reichb.*, 84.

Scirpus pauciflorus, *Lightf.*, 93, 94.

S. Tabernæmontani, *Gmel.*, 109 ?, 110.

S. Caricis, *Retz.*, 74.

S. rufus, *Schrad.*, *var. bifolius*, *Wallr.*, is rather frequent growing
with the type.

Eriophorum vaginatum, *L.*, 78, *i.e.* in all the vice-counties.

Schœnus nigricans, *L.*, *var. nanus*, *Lange*, 108.

- Carex rupestris*, *All.*, 105 confirmed.
C. divisa, *Huds.*, 90 confirmed.
C. arenaria, *L.*, 84.
C. teretiuscula, *Good.*, 93, 94.
C. paniculata, *L.*, *var. simplicior*, *Anderss.*, 74, 87, 89.
C. vulpina, *L.*, 93.
C. echinata, *Murray*, 78, *i.e.* in every vice-county.
C. remota, *L.*, 93.
C. curta, *Good.*, 108.
C. curta × *rigida*, 106.
C. atrata, *L.*, 94.
C. Hudsonii, *Ar. Benn.*, 73 ?, 74.
C. acuta, *L.*, 99 confirmed.
C. rigida, *Good.*, 74.
C. aquatilis, *Wahlenb.*, 101 ?, 105 ?.
C. Goodenowii, *J. Gay*, *var. juncella* (*T. M. Fries*), 93.
C. Goodenowii × *rigida*, 98.
C. limosa, *Aggr.*, 83.
C. eu-limosa, *L.*, 100, 103, 105.
C. rariflora, *Sm.* *Delete 108.*
C. pilulifera, *L.*, 84 ; *var. longibracteata*, *Lange*, 94, 106, 108.
C. verna, *Chaix*, 94.
C. pallescens, *L.*, 93, 94 ; *var. undulata*, *Kunze*, 106.
C. panicea, *L.*, *var. tumidula*, *Læstæd.*, 90.
C. capillaris, *L.*, 107.
C. pendula, *Huds.*, 84.
C. sylvatica, *Huds.*, 93, 94.
C. lævigata, *Sm.*, 78, 93.
C. binervis, *Sm.*, *subsp. Sadleri*, *Linton*, 90 confirmed, 109.
C. binervis × *rigida*, 106.
C. distans, *L.*, 93.
C. extensa, *Good.*, 108.
C. flava, *L.*, *segr.*, 93, 95 ; *var. elatior*, *Schlecht.*, 94, 108 ; *var. cyperoides*, *Marss.*, 93.
C. flava × *fulva* (= *xanthocarpa*, *Degl.*), 91, 93, 94, 97, 105, 108.
 The insertion of a hyphen for a comma between 98 and 102 in the former list seems to imply that this hybrid was recorded for 99, 100, 101, but for these it has not been so, and they should be deleted.
C. flava × *pulla*, 88, 98.
C. acutiformis, *Ehrh.*, 93.
C. riparia, *Curtis*, 109 ; *delete 74.*
C. vesicaria, *L.*, *var. alpigena*, *Fr.*, 105.
C. rostrata × *vesicaria*, 96, 101.
C. pulla, *Good.*, *aggr.*, 106.

(To be continued.)

TOPOGRAPHICAL NOTES ON HIERACIUM.

By the Rev. E. F. LINTON, M.A.

IT is almost impossible as yet to make a perfect record of the distribution of Hawkweeds in Scotland, since many plants have changed their names since first reported, and many records need confirming or revising. Prof. Trail's list (p. 93, etc.) forms a good basis to work upon, being the result of a careful collation of the three most recent works on the (British) genus; and it reflects some of the existing confusion.

H. nigrescens, Willd., for example, is given for "88, 92, 98, also recorded for 85, 89, 90, 94, 96, 97, 105, 108, but often confounded with other allied forms." Of these 88 is the only one published by W. R. Linton and A. and J. Groves (Hanbury), and the only perfectly certain one. Dr. Williams adds 98 on the strength of Rev. E. S. Marshall's Ben Creachan specimens, entirely against Mr. Marshall's judgment and Dr. Elfstrand's naming. This must go; 92 I have not traced, but I have specimens which I think would justify both 92 and 90; probably also 72 (a form). Of the others, 94, 97, 108, may be regarded as transferred to *H. curvatum*, Elfstr., and the rest as *sub nube* for the present.

In the following notes I keep to the same order as Prof. Trail, viz. that of Rev. W. R. Linton's "British Hieracia."

H. alpinum, L. This in the restricted sense is known certainly for 90, 92, 94, 97; confirmation is desirable for other records.

H. pseudonosmoides, Dahlst. 104 may certainly be added, recorded by W. R. Linton and myself under the name *H. buglossoides*. This plant was first named by me on Braemar specimens *H. onosmoides*, and confirmed by Dr. Lindeberg; then revised by me and confirmed by M. Arvet-Touvet as *H. buglossoides*, Arv. Touv.; finally run down to its present name and confirmed by Am. Dahlstedt.

H. buglossoides, Arv. Touv. 106, 107 are the only records for this species; most others referring to the preceding species. This plant, at first supposed to be a form

of *H. dovrense*, Fr., and then to be *H. onosmoides*, Fr., was eventually submitted to M. Arvet-Touvet, who forthwith rejected the Skye-Braemar-Moffat plant as not typical, and claimed this Tain plant as exactly his *H. buglossoides*.

H. silvaticum, Gouan, aggr. Prof. Trail (p. 96) says, "All except 73, 103." This statement of wide distribution is perhaps founded on a note in "British Hieracia," ambiguous because too condensed, "This is the *H. murorum*, var. β *silvaticum*, of Linnæus, etc." This note gives the impression that the restricted *H. silvaticum*, Gouan, includes all the numerous forms that we have associated with *H. murorum*, auct. angl., whereas in "British Hieracia" it only includes a few varieties which are scarce and very local. Var. *micracladium*, Dahlst., is the most frequent, and may perhaps be on record for nine Scottish vice-counties. Var. *phacotrichum* should be *phæotrichum*, and I agree with W. R. Linton in doubting very strongly any British record of it.

H. custalis, Linton. Omit 92; I have withdrawn this plant as not identical.

H. duriceps, F. J. Hanbury. The counties from which this "has been recorded" must all be struck out except 98, 108, and 112, the ones referred to in "Brit. Hier." The case is an instructive one. *H. duriceps* was founded on specimens gathered at Bettyhill by Mr. Hanbury in 1884. In the next two or three seasons several gatherings were made of a very similar looking plant, and recorded as *H. duriceps*. Most of these gatherings proved to be *H. micracladium*, Dahlst., and in course of time came to be so recorded. These deduct largely from the records of *H. duriceps*, and account for most if not all of the erroneous ones.

H. truncatum, Lindeb. To the best of my knowledge 112 is the only genuine record.

H. stictophyllum, Dahlst. (= *H. sparsifolium* bot. angl.). I can confirm 72 (Moffat frequently, and Sanquhar), and 73; also 110 (Stornoway); and can add 108; but can find no data for 86, 99, 102, 105. It is, however, a very distinct species, not easily mistaken. Omit 97; this record belongs to *H. sparsifolium*, Lindeb.

H. strictum, Fr. I have specimens from 96.

H. corymbosum, Fr., var. *salicifolium*, Lindeb. A plant

from Hobbister, 111, gathered and cultivated by Syme, was named in hb. Hanbury, var. *salicifolium*, by Dr. M. Elfstrand, and some evidence exists in opinions on specimens of the Hobbister plant in my herbarium which supports this view.

H. umbellatum, L., var. *linariifolium*, Wallr. 74, New Luce; specimen from Mr. James M'Andrew, received some years ago and named by me *H. umbellatum*, L. Does the record of the type depend on this?

Var. *coronopifolium*, Fr. A specimen received from Mr. Johnstone from the neighbourhood of Moffat, 72, which I named for him then *H. umbellatum*, I see now is this variety, new apparently for Scotland.

EDMONDSHAM, SALISBURY.

ZOOLOGICAL NOTES.

Melanism in Bats.—About noon on 11th June 1906 a gentleman brought me a Bat he had just captured near the museum. The specimen being of a dark colour, indeed almost black, I sent it to Mr. Wm. Eagle Clarke, of the Royal Scottish Museum, who very kindly identified it for me as a melanic specimen of the Pipistrelle (*Pipistrellus pipistrellus*).—ALEXANDER M. RODGER, Museum, Perth.

Killer or Grampus (*Orca gladiator*) in Skye Waters.—On 28th July last a whale was playing in Broadford Bay which I made out to be the above-named species. It came to the surface several times quite close to the R.M.S. "Gael," showing clearly the high-pointed dorsal fin and a large blotch of greyish white colour on the back close to the base of the fin.—HUGH BOYD WATT, West Hampsted, N.W.

Rare Birds at Fair Isle.—During a recent visit to Fair Isle for the purpose of observing the migration of birds, we were fortunate enough to come across a number of interesting species, some of which are extremely rare visitors to Scotland, and two of them are quite new to its avifauna. The new Scottish species are a Scarlet Grosbeak (*Carpodacus erythrinus*), a bird of the year, shot on 3rd October, and a Reed Warbler (*Acrocephalus streperus*), a male of which was captured on 23rd September. Next in point of rarity was the Red-breasted Flycatcher (*Muscicapa parva*); several of these birds were observed, and two obtained, on 20th and 21st September. Not less rare, or even rarer as a British bird, is the Little Bunting (*Emberiza pusilla*), one of which was

obtained on 3rd October. Another visitor of very uncommon occurrence was the Yellow-browed Warbler (*Phylloscopus superciliosus*), and of this no less than six examples were seen between 19th and 25th September. Of the Arctic Bluethroat (*Cyanecula suecica*) about a dozen came under notice, and adults and young birds were secured. A young Ortolan (*Emberiza hortulana*) on 18th September completes the list of rarities. In all seventy-three species of migratory birds came under our notice during the five weeks spent on the island. Specimens of all the species named have been presented by us to the collections of the Royal Scottish Museum.—W. EAGLE CLARKE and NORMAN B. KINNEAR, Edinburgh.

Bird Notes from Tiree.—When flapper-shooting at the beginning of August, the dog captured a young Water Rail (*Rallus aquaticus*) which was still unable to fly, so that the bird breeds in Tiree. Towards the latter end of July I saw three young Thrushes (*Turdus musicus*) about some whins. I had noticed the old birds now and then all summer about a few low laurel bushes in a garden.—PETER ANDERSON, Tiree.

Tree-Sparrow in Bute.—On 8th April, 1906, I saw three Tree-Sparrows (*Passer montanus*) at a farm in South Bute, and in the beginning of June I ascertained that the species was breeding in low, ivy-grown cliffs in the neighbourhood. The nests were either in the ivy or in crevices of the rock. The House-Sparrow was nesting in the same situations, and on a visit paid in the middle of July, two nests which had been occupied by House-Sparrows early in June contained eggs of the Tree-Sparrow. Altogether, I believe, not less than twenty pairs were nesting on the ground under observation. The Tree-Sparrow has not previously been recorded for the Island of Bute, and according to the list of the "Birds of Clyde," compiled by Mr. John Paterson for the British Association Handbook (1901), there are only two former records of the species nesting in Clyde, at Ardrossan, and at Annbank, Ayrshire.—JOHN ROBERTSON, Glasgow.

Greenland Falcon in Barra.—On the 26th of March 1906, my brother Mr. Murdo Macgillivray shot a fine specimen of the Greenland Falcon (*Falco candicans*) in Barra. This makes the fourth specimen of this species obtained in Barra during the last twenty years.—W. L. MACGILLIVRAY, Eoligary, Barra.

Nesting of the Grey-Lag Goose, etc., in the Tay Area.—The opening of the season for wild-fowl at the beginning of August resulted in several interesting species being secured in the "Tay" area. In the first place, attention may be directed to the fact that the Grey-lag Goose (*Anser anser*) nested in the district; a young bird, one of three, about half-grown, and unable to fly, having

been obtained. A pair of old birds was seen early in August last year, but it was not suspected that they were nesting, and hitherto no young birds have been observed. On the same day as the goose was obtained, examples of the Gadwall (*Anas strepera*) and Pintail (*Anas acuta*) were shot, out of what were apparently family parties of seven and five respectively. They were both birds of the year, and although fully grown and flying strongly, there is little reason to doubt that they had been bred in the district.—T. G. LAIDLAW, Perth.

Hybrids between Black Game and Pheasants in Scotland.—

Although St. John refers to this cross as not uncommon, the number of specimens actually recorded from Scotland is very small, while on the other hand between 30 and 40 instances are known to have occurred in England and Wales. The only Scottish occurrences known to me are given in detail below, and it will be seen that the information with regard to some of them is very defective. If any of your readers can give me any additional notes or particulars to aid in the preparation of a paper on this hybrid I shall be very grateful.

(1) A male bird, shot in the autumn of 1835 near Lochnew, Wigtownshire, which passed into the possession of Sir A. Agnew. It was fully described by Thompson in the "Mag. of Zool. and Bot.," vol. i. (1837), and subsequently reprinted in the same writer's "Nat. Hist. of Ireland," Birds, vol. ii. pp. 41-44.

(2) One recorded in the Badminton Library volume on "Shooting, Moor and Marsh" (p. 48), by Lord Walsingham and Sir R. Payne-Gallwey, as existing in the collection of the Earl of Home at Douglas Castle, Lanarkshire. No date assigned.

(3) One formerly in the possession of Mrs. Hunter, and now the property of Mr. J. Charlesworth, shot at Glen App, Ayrshire, some time previous to 1890. This is the bird which is figured by Mr. J. G. Millais in "Game Birds and Shooting Sketches," plate facing p. 34 (folio edition).

(4-5) Two shot at Monreith, Wigtonshire, by Mr. J. Henry Stock; the first on 10th October 1893, while Partridge shooting on a farm called Dowies, and the second on 27th October, about a mile from where the first was killed. Both birds are in Mr. Stock's collection at the White Hall, Tarporley, Cheshire, and have not been previously recorded to my knowledge.

(6) One shot by Captain M. Murphy at Bunessan, Mull, in January 1896, was exhibited by Mr. J. E. Harting at a meeting of the Linnean Society on 20th February 1896. It is apparently the same bird which was exhibited by Mr. J. G. Millais at the meeting of the Brit. Ornith. Club on 21st February, 1906, although there stated to have been shot in November 1895. It is now the property of Miss Lees, and is supposed by Mr. Millais to be the produce of a Blackcock and hen Pheasant.

(7-8) Two shot at Glen App, Ayrshire, about the year 1897.

(9) One exhibited by Mr. W. P. Pycraft at a meeting of the Brit. Ornith. Club, on 21st February 1906. It was shot by Mr. W. M. Neilson at Barcaple, Ringford, Kirkcudbrightshire ("Bull. B. O. C." 1906, p. 54), and was received for preservation by Mr. Rowland Ward on 22nd January 1906, having been shot a day or two previously.—FRANCIS C. R. JOURDAIN, Clifton Vicarage, Ashburne, Derbyshire.

Supposed breeding of the Jack Snipe in Shetland.—On the 12th June last, coming across the Scattald here, my setters set their heads close together. On walking up I found a young Jack Snipe (*Gallinago gallinula*), about half grown, before them. The yellow feathers down the back were most distinct. I called the dogs off and hunted round and found two old Jack Snipe, and another young one able to fly a short distance. I am perfectly certain of their being Jack Snipe. My attendant of his own accord said "Jack Snipe." So far north there is nothing surprising in this, especially as an old Shetland sportsman told me he had shot Jack Snipe in Shetland in August, before the Wild Bird Act came into force.—R. C. HALDANE, Lochend, Shetland.

[The supposed breeding of the Jack Snipe in Shetland is an old, old story, but we cannot regard the evidence hitherto adduced as entirely satisfactory. We are afraid that naturalists have become sceptics on this subject, and will demand the production of the eggs along with one or both of the parent birds before the nesting of this species in our Islands can be accepted as an established fact.—EDS.]

Ruffs and Reeves in Shetland.—On 1st September, when in the marsh between lochs Spiggie and Brew, I put up over a dozen Ruffs and Reeves (*Machetes pugnax*) in one flock. I have often found an odd bird here at this season and earlier, but never so many at one time. I went through the marsh again on the 7th, but they had evidently passed on, as I did not come across a single bird of this species.—T. HENDERSON, Jun., Dunrossness.

Sandwich Tern at Loch of Strathbeg.—But once have I noticed Sandwich Tern (*Sterna cantiaea*) near Peterhead. However, on 27th July last I happened to be visiting the Loch of Strathbeg, which is close to the sea, and was surprised to see quite a fair-sized flock, which, with Common Tern and Black-headed Gulls, were quite excited over my intrusion. Their behaviour was as if they had nested there, but of that I could not make sure.—WILLIAM SERLE, Duddingston.

Fulmar inside the Outer Hebrides.—Fulmars (*Fulmarus glacialis*) appear still to be rapidly extending their area of nesting

and flights. I hear of them nesting on the cliffs of Dunnet Head, Caithness, and on 25th July Mr. John Pedder saw one which was in near proximity to Isle Ornsay (Skye). This is a new note since the issue of the "Fauna of N.W. Highlands and Skye," and worthy of record.—J. A. HARVIE-BROWN.

Fulmar Petrels at Whalsay and Yell, Shetland.—On the afternoon of 31st May I went to the Head of Clett along with Mr. Bruce of Symbister, as it was reported that the Fulmar Petrels (*Fulmarus glacialis*) were building there. We made careful observations, but failed at first to see any, and were just going away when I observed one coming over the brow of the cliff, and a little later watched a pair for a long time flying between the sides of a large "gio," where their nest was probably situated. On inquiring I found that the Fulmar had begun building on the north-east of the island, but their nests had been destroyed there. Captain Johnson of the s.s. *Earl of Zetland*, told me that last year a pair built on the "Horse" of Bunavor, Yell, and this season there is quite a large colony.—JOHN S. TULLOCH, Lerwick.

Sirex juvenescens in Nairnshire.—A specimen of the "wood wasp" (*Sirex juvenescens*) was found at Nairn on 15th September last by Mrs. Grant, Drumalan, Drumnadrochit. It was captured on the grass in front of the house.—HENRY H. BROWN, Cupar-Fife.

Oncomyia sundevalli (Ztt.), etc., from Arran.—During September 1903, and in the same month of the present year, I spent a fortnight at Whiting Bay, Arran, and collected Diptera, of which a few of the more notable are here recorded:—

Scatopse flavicollis, Mg.—About a dozen fell into the net on shaking a dead larch branch. Moist wood, north of road between King's Cross and Lamlash, ix. '03.

Bibio clavipes, Mg.—♂ and ♀ in cop. ix. '03.

Orphnephila testacea, Ruthé.—A single male at Knockankelly, window of house, ix. '06. Identified by Mr. Grimshaw.

Oncomyia sundevalli, Ztt.—♀ This interesting species was first taken in Britain by Mr. Bowhill in August 1904 (see "Ann. Scot. Nat. Hist." October 1904, Grimshaw). My specimen taken from scabious flowers by sweeping seemed referable only to this species, and Mr. Grimshaw agrees in this identification. It should be noted that the black dorsal stripe of the ♂ is represented in the ♀ by indefinite dark reflections on an ashy grey ground. The genitalia in the ♀ also are large and prominent, but in the ♂ much less distinct. Loc. Knockankelly.

Hæmatobia stimulans, Mg.—♂ taken by sweeping, Knockankelly, ix. '03. I also took two ♀ ♀ from a cow, ix. '06. They are enormously swollen with blood.

Pyrellia cyanicolor, Ztt.—♀ on Heracleum, ix. '03.

Lucilia sylvarum, Mg.—♀ This very distinct Muscid has two abdominal macrochaetae. Apparently uncommon, for I know of no other Scottish record. For interesting notes on the larval habit of this and the closely allied *L. bufonivora*, Moniez. (see "The Entomologist," March 1899, p. 76). Loc. Knockankelly, ix. '03.

Homalomyia mutica, Ztt.—♂ certainly, and apparently ♀ also, ix. '03.—JAMES WATERSTON, Edinburgh.

Milax (Amalia) gagates, *var. rava*, in S.W. Perth.—On 22nd September I found a single example of this slug in a garden at Callander. There are very few Scottish records for the species, but one of them—by Mr. G. M'Dougall—is from near Bridge of Allan in the same vice-county (87). I am indebted to Mr. W. D. Roebuck for the identification of my specimen.—WILLIAM EVANS, Edinburgh.

Ripersia subterranea, Newst., in "Forth."—Females of this interesting little Coccid were common on the undersides of stones covering nests of the small yellow ant (*Lasius flavus*) at North Queensferry, Fife, 11th April 1906. In the same nests there were also numbers of the Aphis *Paracletus cimiciformis*, Heyd.—Mr. R. Newstead has kindly examined specimens of both species for me.—WILLIAM EVANS, Edinburgh.

Further Siphonaptera (Fleas) from "Forth."—To the list of Siphonaptera from this area given in my paper in last number of the "Annals" (pp. 161-163) I have to add two others since obtained, namely:—

Ceratophyllus walkeri, Rothsch. ("Ent. Mo. Mag." 1902).—One (♀) from nest of the Common Field-Vole (*Microtus agrestis*), Crosswood, Pentlands, 30th August 1906. Two specimens of *Hystrihopsylla talpæ* were also got from the same nest.

C. farreni, Rothsch. ("Ent. Mo. Mag." 1905).—In July last I took a dozen examples of this recently described species, along with a few *C. gallinæ*, from a martin's nest in a window of a house near Liberton, Midlothian. The nest was built in 1905, and was not occupied by martins this year; sparrows, however, were frequently seen at it. *C. gallinæ*, it may be mentioned, was found plentifully in nests of Starling and Jackdaw in May and June, and *C. newsteadii* also occurred in a Jackdaw's nest.

I am obliged to Mr. R. G. Linton for a large number of both sexes of *Pulex canis*, Curt., taken from a rough-haired fox terrier at the Royal Veterinary College, Edinburgh, in September.

The above have all been examined by Mr. Rothschild or his assistant Mr. Cox.—WILLIAM EVANS, Edinburgh.

BOTANICAL NOTES AND NEWS.

Aliens among Tares in Aberdeenshire.—In April 1904 I recorded the occurrence in the previous autumn in the neighbourhood of Inverurie, Aberdeenshire, of several aliens among tares. Since that time I have occasionally found some of these species here and there among tares, but not in such frequency, until in August of this year, while staying in the parish of Midmar. The examination of a small field of tares on the farm where I was staying showed a large number of aliens, among which the following species were found:—*Vicia dasycarpa*, Tenore, in abundance, with one or two plants that appear to belong to the var. *glabrescens* (Koch). *V. sativa*, L., the usual form only moderately plentiful, along with a few of a more slender variety of this species, with solitary smaller flowers, but otherwise like the type. *V. amphicarpa*, Dorthes?, common, and varying in colour of flowers from yellowish white to pink; several of the specimens showed cleistogamous flowers followed by pods, near the base of the stems, but I found no subterranean branches; some show a resemblance to large *V. angustifolia*, but most were markedly unlike our Scottish *V. angustifolia*. *V. monantha*, Desf., frequently, the stipules varying greatly from almost undivided to palmately fringed with long teeth. *V. lutea*, L., frequent, the flowers having a tendency to lilac in one or two plants. *V. Ervilia*, Willd. scarce. *V. Faba*, L., a few. *Lathyrus Aphaca*, L., very frequent. *L. sativus*, L., scarce. *L. annuus*, L., a few, the flowers of most being of a curious shade of orange-brown. *Pisum arvense*, L., frequent. *P. sativum*, L., a few. Of species outside the order Leguminosæ there were several suggestive of introduction among the seed sown. Certainly introduced in this way were *Saponaria Vaccaria*, L., *Coriandrum sativum*, L., *Galium tricornis*, With., and *Asperula arvensis*, L., of which a few only were found, and *Linum usitatissimum*, L., which was frequent. Probably introduced with the seed were *Agrostemma Githago*, L., and *Centaurea Cyanus*, L., seen only among tares in this district, and the variety *intermedia* (Gilib.) of *Plantago major*, L., which was not uncommon among these tares, though not seen elsewhere in Midmar. In other patches of tares in Midmar and neighbouring parishes I found several of the above, such as *Vicia monantha*, *Lathyrus Aphaca*, and *Galium tricornis*, and along with them *Fagopyrum esculentum*, Moench, though in no other place were so many species of “aliens” grouped together.

The “tares” sowed in the district were found to be largely supplied from Aberdeen as “foreign tares.” I learned, on inquiring in Aberdeen, that they are chiefly imported from Königsberg, in East Prussia, and that for a few years they have been a good deal used in Aberdeenshire, but that there is little sale for them south of Stonehaven or west of Banffshire. The seeds sold as “foreign

tares" showed great diversity, though scarcely so great as the resulting crops would lead one to expect. Though imported from Königsberg the assemblage of plants suggests that they are brought to that port from more southern lands.—JAMES W. H. TRAIL.

Procumbent Meadow Grass (*Sclerochloa procumbens*, Beauv.) in Scotland.—This small grass is given in Watson's "Topographical Botany" (1883) for Ayr, Berwick, Edinburgh, and Forfar, all being "doubtful"; but whether the doubt rests on the identification of the plant or on its claim to be reckoned a native is not expressed. There is no evidence to prove that it is native in Scotland; but it has been recorded from Stirlingshire in 1891, by Mr. Kidston, as introduced; from Gourdon in Kincardineshire in 1903, by Mr. A. Somerville, who found it growing by the side of a road near the harbour; and from Leith Docks in 1904, by Mr. James Fraser, in his lists of casuals. In each of these cases the plant grew where there was reason to believe that it had been introduced accidentally. This year it has appeared in great abundance on the north bank of the Dee at Aberdeen, from the Victoria Bridge eastwards for some hundred yards. It grows between the stones facing the artificial channel of the river, and also on a strip of ground bordering the river's bank. I have also found it in fair quantity on two patches of the town rubbish that is being spread over part of the Links east of Old Aberdeen. There is no record of its occurrence near Aberdeen before 1906; and it is not easy to explain its presence in so great amount this year, as its merits would scarcely lead to its being sown intentionally; but there can be no doubt that it is not a native. It is not likely now to disappear, however it may have come on the scene.—JAMES W. H. TRAIL.

Synchytrium Stellariæ, *Fuckel*, in Aberdeenshire.—While staying for a month in Midmar, I found early last August on a limited area beside a farm near Comers in this parish several plants of Chickweed (*Stellaria media*) much altered by this parasitic fungus. The stems and leaves were swollen, fleshy in texture, and of a dull orange-yellow colour owing to the abundance of the small warty swellings in which lay the cells of the fungus. So far as I am aware it has not been previously recorded from Scotland. The genus *Synchytrium* is of considerable interest, its species forming small galls on various plants. Four species have been already recorded by me from Scotland, on *Anemone*, *Scabiosa Succisa*, *Taraxacum*, and *Mercurialis perennis*; and some time since I found a species infesting shoots of *Viola ericetorum* on sandy soil near Newburgh, in Aberdeenshire. Unfortunately circumstances prevented me from making a critical examination of the example gathered; hence I do not venture to refer this form to its species until new material permits of certainty. No doubt various others would repay a careful search among our native vascular plants.—JAMES W. H. TRAIL.

Gall on Elder or Bourtree (*Sambucus nigra*, L.).—In July 1892 Dr. Buchanan White sent me from near Perth galled flower buds of this plant, which were recorded and described in the *Annals* (July 1892, p. 265) as probably formed by *Diplosis lonicerearum*. Last year I found these galls in plenty on a bush at Kemnay, near the Don, about fifteen miles north-west of Aberdeen; and in the end of August 1906 it was plentiful on this bush and on another at Sauchen in Cluny, a few miles west of Kemnay.—JAMES W. H. TRAIL.

The Hessian Fly (*Mayetiola destructor*) in North-Eastern Scotland.—This insect, first observed in England, on wheat, in July 1886, was also found in Scotland near Crieff and Inverness on barley in that year, and has been occasionally reported as observed in subsequent years, but rarely in such numbers as to be seriously hurtful. This year, however, it appears to have been abundant in the north-east of Scotland on barley. In the end of July portions of injured stems were sent to me from a farmer in Banffshire, near Turriff, with a request for information as to the cause of injury, which was shown to be this midge by the pupæ; and on inquiry I was informed that the barley fields in that neighbourhood were widely infected. I spent August in Midmar, and found the insect's work very evident in every field of barley there, and in all the parishes for some distance around in the valleys of both Dee and Don. I saw no larvæ, but the pupæ were only too numerous. The injured stems in some fields were under 5 per cent; but in a few places they seemed to reach upwards of 20 per cent, the average lying between 5 and 10 per cent. A large proportion of the stems had the seeds more or less formed, but they did not appear to ripen. In many plants the injury to the chief stem had led to the growth of one or more shoots from its base, which bore small heads, but were so much behind the uninjured stems in their growth as to have no likelihood of ripening or of making good the loss to the crop. Probably the pest has been observed in other districts also this year in greater abundance than usual.—JAMES W. H. TRAIL.

Census Moss Catalogue of the British Isles.—A Committee of the Moss Exchange Club is preparing a Census Catalogue, recording the distribution of Mosses in the British Isles, and would be glad to hear from any bryologists who can render assistance. Communications to be addressed to Professor T. Barker, Woodlea, Lightwood, Buxton. The *Committee* is H. N. Dixon, T. Barker, W. Ingham, D. A. Jones, R. H. Meldrum, W. E. Nicholson, Rev. C. H. Waddell, J. A. Wheldon, and S. M. Macvicar. Further assistance to improve the lately published Census Hepatic Catalogue will be welcomed by W. Ingham, 52 Haxby Road, York.—W. INGHAM, Hon. Sec. Moss Exchange Club.

CURRENT LITERATURE.

The Titles and Purport of Papers and Notes relating to Scottish Natural History which have appeared during the Quarter—July-September 1906.

[The Editors desire assistance to enable them to make this Section as complete as possible. Contributions on the lines indicated will be most acceptable, and will bear the initials of the Contributor. The Editors will have access to the sources of information undermentioned.]

ZOOLOGY.

GADWALL NESTING IN PEEBLESSHIRE. H. B. Marshall. *The Field*, 28th July 1906, p. 196.—A pair settled on a small lake and rearing a brood of young at Broughton. An editorial note gives a summary of the occurrences of the species in Scotland.

ON THE HYBRIDS WHICH HAVE OCCURRED IN GREAT BRITAIN BETWEEN BLACK-GAME AND PHEASANT. Rev. F. C. R. Jourdain, M.A., M.B.O.U. *Zoologist*, September 1906, pp. 321-330, pl. iv.—Fifty hybrids recorded, including seven from Scotland.

PALLAS'S SAND GROUSE IN EAST LOTHIAN. C. E. S. Chambers. *The Field*, 2nd June 1906, p. 901.—A flock of six seen on some "well-known links."

JACK SNIPE IN ELGINSHIRE IN AUGUST. J. Brander Dunbar. *The Field*, 25th August 1906, p. 342.—One shot near Loch Spynie on 10th August, and another reported from Pitgaveny. A long editorial note given in reference to the occurrences and nesting of this species.

LOCH BROOM SEA MONSTER. W. H. Workman, J. T. Henderson, and T. Southwell. *Zoologist*, September 1906, pp. 355-357 and fig.—Refers to a creature observed outside Loch Broom by the excise officers, and on 24th August by J. T. Henderson, and supposed by him to be a Basking Shark (*Selache maxima*). Mr. Southwell concurs in this opinion, but other authorities regard it as a *Balænoptera*.

MONOGRAPH OF THE LAND AND FRESH WATER MOLLUSCA OF THE BRITISH ISLES. John W. Taylor. Part 12 (15th June 1906), pp. 225-280 and 1-16, pls. xv., xxii., xxiii., and xxv.—Includes *Arion hortensis*, *circumscriptus*, *intermedius*, *Geomalacus maculosus*, an Appendix of 19 pages; also the commencement of the Family *Zonitidae*, including *Vitrina pellucida*. All known Scottish localities are given.

COLLECTIVE INQUIRY AS TO PROGRESSIVE MELANISM IN LEPIDOPTERA. Summary of evidence prepared by L. Doncaster, *Ent. Record*, 1st July, 20th July, and 15th September 1906, pp. 165-168,

206-208, and 222-226.—An exhaustive report, with details of localities in which melanic forms have been observed. Numerous Scottish records are included.

LEPIDOPTERA AT KINLOCH-RANNOCH. Percy C. Reid, *Ent. Record*, 1st July 1906, p. 189.—Notes on a dozen species.

ADDITIONS AND CORRECTIONS TO THE LIST OF BRITISH HYMENOPTERA SINCE 1896. Edward Saunders, *Ent. Mo. Mag.*, July, August, and September 1906, pp. 151-155, 172-177, and 202-206.—Numerous Scottish records are given in this useful summary.

CRYPTOHYPNUS PULCHELLUS, L. James E. Black, F.E.S., *Ent. Mo. Mag.*, July 1906, pp. 155-156.—Refers to the capture of several specimens on the banks of the river Truim, a tributary of the Spey.

DIPTERA IN SCOTLAND IN 1905. A. E. J. Carter, *Ent. Mo. Mag.*, August 1906, pp. 181-182.—Sixty-four species recorded, all from the Forth district.

NEUROPTERA FROM NORTH UIST. K. J. Morton, *Ent. Mo. Mag.*, July 1906, p. 162.—Ten species recorded, all captured by Mr. James Waterston in June 1905.

BOTANY.

A COMPARATIVE STUDY OF THE LAKES OF SCOTLAND AND DENMARK. By C. Wesenberg-Lund (*Proc. Roy. Soc. Edin.*, xxv., 1905, pp. 401-448, 2 plates).

CAREX NOTES. By C. E. Salmon (*Journ. Bot.*, 1906, pp. 224-227).—Enumerates varieties and hybrids new to Britain, several being from Scotland.

BOOK NOTICES.

THE BIRDS OF THE CAMBRIDGE REGION OF MASSACHUSETTS, with 4 plates and 3 maps. By Wm. Brewster. "Memoirs of the Nuttall Orn. Club," No. IV. Cambridge, Mass. 1906.

This charming volume is of considerable interest, and well worthy of perusal by ornithologists who make a study of the changes which affect bird-life of any area, whether at home or abroad. It presents a chronological exposition of the history of the fauna of a limited area during the short space of some seventy years, and can hardly fail to prove suggestive in similar directions. It first describes in detail the surrounding country during the lifetime of the writer, and gives lists of the species which were known

to frequent the various localities before the great changes took place. Along with his own observations are given those of his many able help-mates, who have placed their notes at his disposal for this work, from between the dates of 1832 and 1860 and to the present time. "Thus," says Mr. Brewster (p. 8), "we have knowledge of them, extending back over a practically unbroken period of more than seventy years." He tells us of the changes in the aspects of, for instance, Mount Auburn, formerly known as "Sweet Auburn." He says of it, "Knolls and ridges have been levelled, swamps and meadows drained or filled; and woods, groves, thickets, and orchards swept away, to make place for settlements of houses, or open, closely-cultivated truck-farms; . . . and throughout the length and breadth of the land the ear is wearied by the ceaseless din of swarming House-sparrows." And in felicitous language and in similar terms he treats of other localities, swamps, marshes, etc., and then illustrates the past and present bird-life of each; and thereafter, in a few well-chosen words, defines the whole area under treatment as affected by the trend of the annual migrations. "It is a well-established fact," he tells us, "that a large proportion of the smaller migratory birds, which pass and repass through Eastern Massachusetts, . . . follow lines of flight which border closely on the sea coast"; and then he illustrates the facts. A section follows (pp. 61-64) which treats of "Faunal Changes" generally, and these he places under headings such as: "Changes in Local Conditions," "Recent Local Protection," "Persecution by Man," "Persecution by the House-sparrow," and illustrates the processes, some of which apply to the whole larger tract of New England. The remaining part of the volume is occupied by the "Annotated List," the plan of which and principles which he has set for himself to follow are spoken of in the opening pages of the preface.

A few words and I have done: I wish to direct attention to the maps and plates. The maps consist of maps of the Cambridge Region in 1635 and 1896, and illustrate the section on "Early Writers," etc.; and at the end of the volume there is a map of "Fresh Pond" and its surroundings about 1866. The plates are: "Frontispiece—Thos. Nuttall"; "A Secluded Pool in the Maple Swamp," 23rd June 1900; "Cabot Shooting Stand," Fresh Pond, 1832-1840; *Acanthis brewsteri* (Ridgeway—coloured).

J. A. H.-B.

A PRELIMINARY LIST OF DURHAM DIPTERA, WITH ANALYTICAL TABLES. By the Rev. W. J. Wingate. 416 pp. 7 plates. Being Vol. II. of the "Trans. of the Nat. Hist. Soc. of Northumberland, Durham, and Newcastle-upon-Tyne." New series. (London and Edinburgh: Williams and Norgate; Newcastle-upon-Tyne: F. and W. Dodsworth, 1906.) Price 9s.

A writer's aim must always influence any judgment on his

achievement, and with this in mind one can hardly overstate the debt under which Mr. Wingate has laid the increasingly large number of students of Diptera not merely in Durham but in Britain. Simply as a local list, embracing almost one-fourth of our hitherto recorded species, the work would have made valuable contributions to a knowledge of the distribution of the order in this island. But Mr. Wingate has a second object in view. Recognising that, in the present incomplete state of the literature in English on his subject, a bare list is useless to any save an expert, he has brought together a set of keys to the families, genera, and species, by means of which the systematic position of a specimen may be indicated. In the compiling of these tables all the best continental and home work of the past fifty years has been laid under contribution, with the result that for the first time we have a convenient compendium of the generic and specific characters of the Diptera of Britain.

In all some 626 sp. are listed, while of the 2880 sp. in Verrall's List, 1901, a guide is given to 2210. In the case of certain genera an important addition is made in the diagnostic features of European species not yet British. In this way some 318 species are referred to. A number of interesting critical notes occur throughout the text. A special word of praise is due to the method employed in describing the wings. By numbering each vein a great simplification in terminology has been effected. The cross veins are determined by the hindmost of the veins connected, *e.g.* the anal cross vein becomes X 6. All confusion is avoided by a careful statement of the homologues in continental writers. The description of cells is equally simple and efficient. The usefulness of this part is increased by a fly chart and several plates planned to show concisely the points of difference relied on in the text. Mention must also be made of two excellent pages on collecting and preserving.

Mr. Wingate is to be congratulated on the completion of his List. The outcome of his own disappointments, it will save many another from a similar experience. Used with discrimination it will be of immense help to beginners, while to the advanced student, though the critical determination of species is beyond its province, it will prove a very handy book of reference.

J. W.

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